Report

Appendix C to the COB Energy Facility EIS

Biological Assessment for the COB Energy Facility

Prepared for

U.S. Fish and Wildlife Service

November 2003

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Acronyms

AC	alternating current
BA	biological assessment
BFD	bird flight diverter
bgs	below the ground surface
BLM	Bureau of Land Management
BPA	Bonneville Power Administration
Btu/kWh	British thermal units per kilowatt-hour
CFR	Code of Federal Regulations
cm/sec	centimeters per second
COPEC	chemicals of potential ecological concern
CTG	combustion turbine generator
dBA	decibel (A-weighted)
EFSC	Energy Facility Siting Council
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ESA	Endangered Species Act
FCRTS	Federal Columbia River Transmission System
GE	General Electric
gpm	gallons per minute
HDPE	high-density polyethylene
HHV	high heating value
HRSG	heat recovery steam generator
kV	kilovolt
MG	million gallon
mg/L	milligrams per liter
MW	megawatt

NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NWPPC	Northwest Power Planning Council
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
PERC	Peoples Energy Resource Corporation
PVC	polyvinyl chloride
RO	reverse osmosis
ROW	right-of-way
SCA	site certificate application
STG	steam turbine generator
TDS	total dissolved solids
USFWS	U.S. Fish and Wildlife Service
WECC	Western Electricity Coordinating Council
WPCF	water pollution control facility
WWTP	wastewater treatment plant

SECTION 1
Introduction

This section provides an overview of the biological assessment (BA) prepared for the proposed COB Energy Facility. The purpose of the BA is reviewed; terminology used throughout this document is defined; species list are identified; critical habitat is discussed; a list of consultations held to date is provided; and the current federal and state management direction for the proposed project is summarized.

1.1 Purpose

The purpose of this BA is to determine to what extent the proposed COB Energy Facility may affect any of the threatened, endangered, proposed, or sensitive species listed in Section 1.2. This BA is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (ESA) (16 U.S.C. 1536 (c)), and follows the standards established in the National Environmental Policy Act (NEPA). Information necessary to initiate formal consultation as required by 50 Code of Federal Regulations (CFR) 402.14(c) is provided.

This BA provides the best available scientific and commercial data for threatened, endangered, proposed, or sensitive species and critical habitat listed in Sections 1.2 and 1.3. The Bonneville Power Administration (BPA) is the lead agency to conduct an environmental analysis pursuant to NEPA and the Bureau of Land Management (BLM) is a cooperating agency.

The following terms are used in this BA:

- The power generation equipment and other onsite facilities are referred to collectively as the proposed Energy Facility or proposed project.
- Development of the proposed Energy Facility is referred to as the proposed action.
- The physical location of the Energy Facility is referred to as the proposed Energy Facility site.
- The Energy Facility site and related or supporting facilities (e.g., electric transmission line, water supply well system, water supply pipeline, and natural gas pipeline) are referred to as the Facility.
- The site certification applicant, COB Energy Facility, LLC, is referred to as the project proponent. The project proponent is a subsidiary of Peoples Energy Resource Corporation (PERC).

1.2 List of Threatened, Endangered, and Candidate Species Potentially Affected by the Proposed Project

Federally listed species considered in this BA include:

- Applegate's milk-vetch (*Astragalus applegatei*) E
- Bald eagle (*Haliaeetus leucocephalus*) T
- Shortnose sucker (*Chasmistes brevirostris*) E
- Lost River sucker (*Deltistes luxatus*) E

Any special-status species whose habitat(s) or known distribution is present within the COB Energy Facility project area was evaluated for potential impacts from construction, operation, and maintenance activities. The following describes the occurrence of these species in the project area:

- There are no reported occurrences or historical records of Applegate's milk-vetch in the vicinity of the project area, no plants were identified during biological surveys, and the Facility would have no effect on Applegate's milk-vetch.
- The bald eagle is known to occur in the project area and suitable nesting habitat was identified within the isolated stand of ponderosa pine habitat along the southern portion of the electric transmission line easement; however, no nests were observed.
- The Energy Facility would be designed to be low discharge. Therefore, no process wastewater would be discharged to surface water or irrigation canals. No cumulative affects are expected to occur to the shortnose and Lost River suckers as a result of construction and operation of the Facility.

State-listed species, Species of Concern (state and federal), and other special-status species that were included on the United States Fish and Wildlife Service (USFWS), the Oregon Department of Fish and Wildlife (ODFW), BLM, and the Oregon Natural Heritage Program (ONHP) lists are addressed in a site certificate application submitted to the Oregon Energy Facility Siting Council (EFSC) on September 5, 2002, and are not evaluated further in this BA.

1.3 Critical Habitat

No critical habitat has been designated for any of the listed species evaluated in this document. Therefore, no critical habitat would be affected by the project. Critical habitat was proposed by USFWS for the shortnose sucker and the Lost River sucker on December 1, 1994 (Federal Register Vol. 59, No. 230). The proposed units near the project area include Gerber Reservoir, located approximately 10 miles to the east, and Tule Lake, located approximately 18 miles to the south, as well as Upper Klamath Lake and the Sprague River, which are located approximately 22 miles west and 20 miles north of the proposed project area, respectively.

1.4 Consultation to Date

Exchanges in communication that have occurred since the fall of 2001 are as follows:

- October 23, 2001—A preliminary (informal) list of threatened, endangered, proposed, and candidate species that may occur in Klamath County, Oregon, was obtained from the Endangered Species division of USFWS.
- December 4, 2001—A formal list of threatened, endangered, proposed, and candidate species that may occur in Klamath County, Oregon, was obtained from the Endangered Species division of the U.S. Fish and Wildlife Service.
- April 5, 2002—Information on rare, threatened, and endangered plant and animal records in the vicinity of the proposed project were obtained from the ONHP.
- April 22, 2002—Mr. Robert Wooley, botanist with the Fremont National Forest, was consulted regarding special-status plants potentially occurring in the project area.
- April 30, 2002—A list of special-status plant species was obtained from BLM's Klamath Falls Resource Area.
- June 5, 2002—Ms. Gail McEwen of ODFW was consulted regarding ODFW habitat classifications and winter mule deer habitat in the project area.
- July 26, 2002—A meeting was held with the Oregon Department of Energy (ODOE) at the Klamath County Planning Department. Representatives from state and federal resources agencies present at this meeting included Leonard LeCaptain (USFWS), Chris Carey (ODFW), and Tom Collom (ODFW). At this meeting the project was introduced to USFWS and ODFW to initiate informal consultation and identify preliminary issues related to wildlife and vegetation.
- August 1, 2002—A site visit was conducted with Leonard LeCaptain (USFWS) and Chris Carey (ODFW) to provide an overview of the project area and a discussion of potential habitat and wildlife issues. Concerns expressed at this meeting were focused on minimizing adverse affects to bald eagles and the ponderosa pine habitat. No formal resolution was reached regarding Bald Eagles. Mr. LeCaptain said that USFWS would need to be further consulted on this issue under Section 7 of the Endangered Species Act. If an evaporation pond is the selected alternative for process wastewater disposal, the agencies recommended covering the evaporation pond with netting to exclude wildlife.
- August 1, 2002—Copies of the COB Energy Facility Notice of Intent (dated December 3, 2001) and an Addendum to the Notice of Intent (dated May 10, 2002) were provided to Leonard LeCaptain (USFWS).
- August 6, 2002—Mr. Gale Sitter from the Bureau of Land Management's Klamath Falls Resource District was contacted regarding habitat mitigation and revegetation plantings in Klamath County, Oregon.
- August 8, 2002—Copies of water quality data obtained from the Babson well in January 2002, were provided to Leonard LeCaptain (USFWS).

- September 18, 2002—Richard Crowe (CH2M HILL) contacted Leonard LeCaptain (USFWS) and Chris Carey (ODFW) regarding the observation of fish in the irrigation canal that was receiving water from the Babson well pump test.
- September 24, 2002—Leonard LeCaptain (USFWS) met with Greg White, a fisheries biologist with CH2M HILL, to investigate fish observed in the irrigation canal receiving discharge from the pump test and observe the shutdown of the pump test. The fish were determined to be red side shiners, a species in the minnow family.
- December 3, 2002—Additional information on the distribution and potential for occurrence of special-status fish species was provided by Leonard LeCaptain (USFWS) and Stewart Reid (USFWS).
- January 15, 2003—Russell Huddleston (CH2M HILL) conducted a site visit with Tom Collom (ODFW), Gale Sitter (BLM), and Rob Roninger (BLM). The purpose of the site visit was to provide an overview of the project area, as well as the habitats and potential wildlife issues. Concerns expressed at this meeting were focused on habitat mitigation for listed species.
- March 5, 2003—Robert A. Trotta (PERC) provided Leonard LeCaptain (USFWS) with a letter prepared by Phil Brown and Ken Trotman of CH2M HILL dated March 5, 2003, and titled *Impacts of Babson Well Deep Aquifer Pumping on Surface Water*. The purpose of the CH2M HILL letter was to provide comments and clarification regarding a December 23, 2002, letter from Marshall Gannett of the U.S. Geological Survey (USGS) to Ron Larson (USFWS). The CH2M HILL letter states that no data gathered from the monitoring well network indicate that the deep aquifer withdrawals would impact groundwater levels in the shallow aquifer, or flows at Bonanza Big Springs and the Lost River.
- May 9, 2003—A draft BA for the COB Energy Facility was submitted to Leonard LeCaptain (USFWS) for review and comment.
- May 29, 2003—Leonard LeCaptain (USFWS) provided written comments on the draft BA.
- June 11, 2003—Robert A. Trotta (PERC) and Mark Bricker (CH2M HILL) met with Leonard LeCaptain (USFWS) to discuss comments on the draft BA. In addition Robert A. Trotta (PERC) informed Leonard LeCaptain (USFWS) that the Energy Facility would switch to air cooling from wet cooling, reducing water requirements by 97 percent.

1.5 Current Management Direction

1.5.1 Bonneville Power Administration

NEPA requires federal agencies to consider environmental values in planning and decision making processes. BPA works closely with other agencies to develop comprehensive and coordinated approaches to protect and rebuild species populations that have been listed under the ESA. BPA is committed to working towards regional solutions based on sound biology and currently provides funding for more than 500 fish and wildlife projects a year that range from improvements to rearing and spawning habitats to study of fish diseases.

BPA also has specific duties regarding fish and wildlife under the ESA:

- BPA must avoid jeopardizing listed species.
- BPA must comply with incidental take statements.
- BPA must use its authorities to conserve listed species.

Electricity generated by the proposed Energy Facility would enter the regional grid at BPA's Captain Jack Substation. Providing this connection triggers the requirement for BPA to conduct an environmental analysis pursuant to NEPA. BPA is the lead agency for NEPA compliance review.

1.5.2 Bureau of Land Management

BLM has established a management plan for fish and wildlife which includes proactive management of special-status plant and animal species (BLM, 2000). BLM works closely with other federal and state agencies to achieve conservation goals for listed endangered, threatened, proposed, candidate and other special-status species. In addition, BLM may establish a list of "Bureau Sensitive" species which would be managed similarly to other designated sensitive species. BLM has a responsibility to protect, manage, and conserve any sensitive species and their habitats such that any BLM action would not significantly affect a species status.

The interconnection from the proposed Energy Facility to the Captain Jack Substation requires a 7.2-mile electric transmission line. The line would cross some federal lands. BLM must decide whether to grant the necessary rights-of-way for the electric transmission line. This action triggers NEPA requirements for BLM. BLM is a cooperating agency for the NEPA compliance review.

1.5.3 Oregon Department of Fish and Wildlife

The mission of ODFW is to protect and enhance Oregon's fish and wildlife and their habitats under the ESA. ODFW has established a habitat classification system that ranks habitats according to six categories based on their relative distribution, importance to fish and wildlife, and mitigation potential. Each ODFW habitat category is associated with specific mitigation goals and standards.

SECTION 2

Description of Proposed Action

This section provides a detailed description of the proposed action.

2.1 History

Recent national and regional forecasts project increasing consumption of electrical energy to continue into the foreseeable future. This increased consumption requires development of new generation facilities to satisfy the increasing demand, as documented in the following citations:

- The Energy Information Administration, a statistical agency of the U.S. Department of Energy, states in the *Annual Energy Outlook 2003 with Projections to 2025* (January 2003), that total electricity demand is projected to grow by 1.9 percent per year from 2001 through 2020 and 1.8 percent per year from 2001 to 2025.
- The Western Electricity Coordinating Council (WECC) forecasts electricity demand in the western United States. In the *10-Year Coordinated Plan Summary 2002-2011* (September 2002), the WECC states that from 2001 through 2011, Northwest Power Pool Area peak demand and annual energy requirements are projected to grow at respective annual compound rates of 2.5 percent and 1.9 percent.
- The Northwest Power Planning Council (NWPPC) in the *Draft Forecast of Electricity Demand for the 5th Pacific Northwest Conservation and Electric Power Plan* (August 2002) states, "Total consumption of electricity is forecast to grow from 20,080 average megawatts in 2000 to 25,423 average megawatts by 2025, an average yearly rate of growth of less than one percent per year."

Generation resources require interconnection with a high-voltage electrical transmission system for delivery to purchasing retail utilities. BPA owns and operates the Federal Columbia River Transmission System (FCRTS), comprising more than three-fourths of the high-voltage transmission grid in the Pacific Northwest, including extra-regional transmission facilities. BPA operates the FCRTS, in part, to integrate and transmit electric power from existing and new federal or nonfederal generating units.

An environmental impact statement (EIS) is currently being prepared to provide BPA and BLM with the environmental information they need to determine whether to allow construction of an electric transmission line on public land and a connection of the Energy Facility to the regional power grid at BPA's Captain Jack Substation. There are no other issues to be resolved. In Oregon, the environmental review is conducted through the state's energy facility siting procedures. The project proponent prepared and submitted a site certificate application for the proposed project on September 5, 2002. The site certificate application was determined completed by EFSC on April 30, 2003. Amendment No. 1 to the site certification application was filed on July 25, 2003, to switch the Energy Facility to air cooling from wet cooling. The focus of this BA is specifically on listed threatened and endangered species that may be affected by the proposed project.

2.2 Facility Description

The project proponent proposes to construct a natural gas-fired, combined-cycle electric generating plant near Bonanza, Oregon (Figure 2-1). The Energy Facility would have a nominal generation capacity of 1,160 megawatts (MW). Electric power from the plant would enter the regional grid at BPA's Captain Jack Substation, located approximately 7.2 miles south of the Energy Facility Site (Figure 2-2). Related or supporting facilities include a 4.1-mile natural gas pipeline, a 2.8-mile water supply pipeline, a 7.2-mile electric transmission line, and a water supply well system that would consist of one existing, reconstructed well and two additional water supply wells.

2.2.1 Process Wastewater Management

Process wastewater from the Energy Facility would be managed by one of three alternatives:

- Beneficial use of the water for irrigated pasture
- Evaporation in an onsite, lined evaporation pond
- Storage and hauling to a wastewater treatment plant (WWTP) for offsite disposal

2.2.2 One- or Two-Phase Combined-Cycle Operation

The project description assumes that the Energy Facility would be constructed in one phase. However, based on conditions of the electric power market after EFSC's approval of the site certificate application (SCA), the project proponent may decide to construct the Energy Facility in two phases. One- and two-phase descriptions are as follows:

- One Phase: If the Energy Facility is constructed in one phase, it would consist of two blocks of a two-on-one configuration in combined-cycle operation as described in the original SCA. A block would consist of two General Electric (GE) model 7 FA (or equivalent) combustion turbine generators (CTGs), two heat recovery steam generators (HRSGs), and one steam turbine generator (STG). The nominal generating capacity at average annual conditions would be approximately 1,160 MW. The heat rate on a higher heating value basis (HHV) would be approximately 7,391 British thermal units per kilowatt-hour (Btu/kWh) when supplemental duct firing is used and 6,842 Btu/kWh without supplemental duct firing.

- Two Phases: If the Energy Facility is constructed in two phases, each phase would be a combined-cycle operation consisting of a single block of a two-on-one configuration. Each phase would have a nominal generating capacity of 580 MW at average annual conditions. The base load capacity would be approximately 450 MW and supplemental duct firing would add up to 130 MW at average annual conditions for each 580-MW phase. For the first 580-MW phase, the heat rate on an HHV would be approximately 7,391 British Btu/kWh when supplemental duct firing is used and 6,842 Btu/kWh without supplemental duct firing.

Unless otherwise noted, references to acres and values represent construction of the entire 1,160-MW Energy Facility.

2.2.3 Facility Location

The proposed Energy Facility site is located 20 miles east of Klamath Falls, Oregon, and 3 miles south of Bonanza, Oregon, on the east side of West Langell Valley Road No. 520 in Klamath County. Access to the site would be from Langell Valley Road No. 520 (see Figures 2-1 and 2-2). The Energy Facility site is located in Sections 23, 25, and 26 of Township 39 South, Range 11 East and would be constructed primarily in fallow agricultural land. Of the approximately 2,700 acres the project proponent has under option, approximately 200 acres are for easement purposes, and approximately 2,500 acres constitute land that would be purchased in fee title. The Energy Facility site itself would permanently disturb 108.7 acres during the 30-year operating life of the Energy Facility , and if the evaporation pond is selected as the wastewater management alternative, the Energy Facility site would permanently disturb 128.7 acres.

The Lost River is located approximately 2 miles north of the Energy Facility site and approximately 0.4 mile east of the water supply well system. Bryant Mountain is located approximately 1 mile south of the Energy Facility site and approximately 1 mile east of the new electric transmission line route.

2.2.4 Permanent Facility Components

The principal components of the proposed action are listed here with more detailed descriptions in Section 2.2.7:

- A new 1,160-MW air-cooled, natural gas-fired combined-cycle electric power generation plant on 50.6 acres of land
- A 31-acre irrigated pasture area
- A designated process wastewater management alternative
  - If a lined evaporation pond is the selected process wastewater management alternative, it would permanently impact 20 acres.
  - If the selected wastewater disposal alternative is either trucking offsite or land application, two 5-million-gallon (MG) wastewater tanks would be constructed on the Energy Facility site.
- A 3.0-MG raw water storage tank on the Energy Facility site
- A new 7.2-mile, 500-kilovolt (kV) electric transmission line to deliver electricity from the proposed Energy Facility to the Captain Jack Substation; the transmission towers and access roads would disturb 57.3 acres of land
- A 0.3-acre area for a water supply well system that would consist of a reconstructed well and two additional water supply wells
- A 1.5-acre stormwater pond and a 4.7-acre stormwater infiltration basin

Table 2-1 summarizes the acreage of habitats permanently affected by feature during the 30-year operating life of the Energy Facility.

2.2.5 Temporary Facility Components

In addition to the habitats permanently affected by feature during the 30-year operating life of the Energy Facility, the following habitats would be temporarily affected during construction:

- A 71.0-acre area for temporary construction parking and laydown (does not include a 6.2-acre laydown and storage area located with the Energy Facility)
- A 1.0-acre area for temporary construction parking and laydown for the water supply well system
- A 2.8-mile water supply pipeline to deliver water from the water supply well system to the raw water storage tank (3.0 MG) on the Energy Facility site; the temporary construction easement would be 19.4 acres
- A new 4.1-mile natural gas pipeline to deliver natural gas to the proposed Energy Facility; the temporary construction easement would be 43.8 acres
- A series of temporary staging areas totaling 7.6 acres that would be used for construction of the electric transmission line

2.2.6 Protection and Mitigation Measures

Protection and mitigation measures include:

- Creation and enhancement of an approximately 236-acre mitigation area that would be enclosed with wildlife-friendly fencing and include water troughs for wildlife
- Installation of bird flight diverters (BFDs) on the new 500-kV electric transmission line to reduce collisions
- Predisturbance surveys for nesting birds and other special-status species, salvage and relocation by biological monitor of individual wildlife in construction impact areas, worker environmental awareness training, and onsite biological monitoring in sensitive areas
- Preservation or creation of snags at several locations along the route of the new electric transmission line to provide habitat for cavity nesting species
- Restoration and enhancement of natural habitats in temporarily disturbed areas in accordance with a Habitat Mitigation and Natural Area Revegetation Plan (Appendix A, a modified version of Attachment P-1 to Exhibit P of the EFSC site certificate application), developed in consultation with USFWS, ODFW, and BLM

This Habitat Mitigation and Natural Area Revegetation Plan offsets the permanent disturbance during the operating life of the Energy Facility and also provides wildlife habitat enhancements. At Facility retirement, the project proponent would implement a Facility Retirement and Site Restoration Plan (Exhibit W in the EFSC site certificate application) to ensure that soil in and around the Energy Facility site is returned to conditions suitable for agricultural use. The electric transmission line would be removed (i.e., the transmission towers, conductors and groundwires, and insulators) and the transmission tower footings would be removed to a depth of 5 feet. The natural gas and water supply pipelines would be capped and left in place.

2.2.7 Energy Facility Site

Each major component of the Energy Facility, including the related wastewater disposal options, are described below.

Energy Facility

Construction of the proposed Energy Facility would result in the permanent habitat disturbance of 45.9 acres during the 30-year operating life of the Energy Facility. The Energy Facility would be constructed entirely on fallow agriculture land.

Mechanics. The Energy Facility is proposed to consist of four GE model 7FA (or equivalent) CTGs with some shared balance of plant services. The CTGs would be outdoor units with thermal insulation and acoustical attenuation. Combined-cycle operation would consist of two blocks of a two-on-one configuration. The exhaust of each CTG would be coupled with a three-pressure HRSG. There would be up to four CTGs and four HRSGs. Steam from two HRSGs would expand through a single condensing steam turbine that drives a STG. Therefore, there would be two STGs. To increase steam-generating capacity, a duct burner system would be included in each HRSG.

Electrical output would be stepped up to 500 kV through generator step-up transformers. The step-up transformers would be located in an onsite switchyard.

A make-up demineralizer system would supply the demineralized water required for steam cycle make-up, CTG compressor water wash, and other high-purity water uses. The make-up demineralizer system would be designed to receive and treat raw water and the recycled or reused water. The make-up demineralizer system would consist of a reverse osmosis (RO) unit followed by a polishing demineralizer. Both systems are discussed in Exhibit O of the site certificate application.

Additional Facilities and Equipment. Other facilities include an administration/control room building, warehouse/maintenance building, parking area water treatment building, raw water and demineralized water storage tanks, stormwater pond, switchyard, septic tank/leach field, gas metering and regulation station, and air-cooled condensers.

Equipment used during construction would include light and heavy trucks, foundation piling equipment, backhoes, bulldozers, graders, cranes, air compressors, welding machines, and power hand tools. The grading plan for the Energy Facility would be a balance cut/fill; therefore, no excess material would be generated. Recyclable materials would be separated from the solid waste stream. Solid waste that cannot be recycled would be trucked to an approved disposal site.

Wastewater Management

Table 2-2 shows the constituents of the process wastewater generated by the air-cooled Energy Facility. The Energy Facility would not discharge any process wastewater directly to surface waters or irrigation canals.

The total dissolved solids (TDS) for the process wastewater would be approximately 1,203 milligrams per liter (mg/L). The principal constituents would be sulfate, silica, and sodium. The estimated process wastewater quality was based on groundwater samples from the deep aquifer (Babson well, KLAM 51920). Process water flows and process recycle rate were determined using the power cycle design water balances. The groundwater would be mixed with recycled process water in the raw water storage tank, and the combined flow would serve as the water source for the process water for the plant. The process water would be cycled through an RO filtration system and a portion would be reused. The remaining fraction would be land applied under the process wastewater management alternative by beneficial use of the water for irrigated pasture.

The constituents in the projected land application water were calculated on the basis of the parameters of the RO system operation and the chemicals added to the process water streams. Sanitary and stormwater waste streams are completely separate from the process water cycle.

For the onsite evaporation pond alternative, two types of chemicals—phosphonates (organo phosphorus) and polyacrylate polymers—would be added to the system for water treatment purposes. Phosphonate is a scale-inhibitor and polyacrylate is a dispersant. The phosphonate scale inhibitor prevents marginally soluble constituents from precipitating by increasing the solubility of these constituents. In the instance that some of the constituents do precipitate out of solution, the polyacrylate dispersant keeps the small particles of the precipitates in suspension, thereby preventing them from forming scales or fouling the RO membrane surfaces.

Process wastewater from the Energy Facility would be managed by one of three alternatives:

- Beneficial use of the water for irrigated pasture
- Evaporation in an onsite in a lined evaporation pond
- Storage and hauling to a WWTP for offsite disposal

Irrigated Pasture Beneficial Use. Process wastewater from the Energy Facility would be managed to provide beneficial use by irrigating 31 acres of pasture (approximate dimensions would be 711 feet wide by 1,900 feet long). Process wastewater would be stored in two 5-MG tanks (one 5-MG tank for each 580-MW power block) prior to pumping over to and irrigating the pasture area. The pasture area would be reduced in half if one 580-MW power block is constructed and later expanded to 31 acres if the second 580-power block is constructed.

During the winter months, the process wastewater would be stored in the tanks and applied by an irrigation system to the pasture area during the summer months. Positive irrigation demands occur from April through September. Irrigation is planned only for those months.

From October through March, precipitation more than satisfies the evapotranspiration (ET) of the pasture grasses.

Process wastewater would be supplied to the irrigation system from the 5-MG process wastewater storage tanks via a booster pump station and a buried irrigation pipeline. The booster pump station would be located adjacent to the process wastewater storage tanks within the Energy Facility footprint and would consist of a 25-horsepower (hp) centrifugal pump on a concrete pad with a starter panel and electrical service, discharge valving, and a flowmeter.

The irrigation pipeline would consist of approximately 3,770 feet of 6-inch polyvinyl chloride (PVC) pipeline buried with 3 feet of cover. The 31-acre rectangular pasture area would be irrigated using a side-roll irrigation system. The 1,900-foot-long side-roll unit would have wheels 4 to 6 feet in diameter around a 5-inch aluminum irrigation supply line. Sprinklers would be located every 40 feet along the supply line. Every 60 feet along the buried irrigation pipeline on the southern edge of the pasture area, a riser valve would be provided for hose connection to the side-roll sprinkler line. Each riser consists of a 5-inch irrigation riser valve extending 12 inches above ground with an 18-inch-by-18-inch concrete pad around the riser. A total of 11 riser valves would be located along the 711-foot southern edge of the past area, requiring 11 irrigation sets to cover the pasture area. During the peak irrigation month of July, approximately two 7-hour irrigation sets would be run each day for 5 days of the week, plus one additional set on the weekend.

The side-roll unit would be stationary during irrigation. However, after an irrigation set at each riser, the side-roll piping would be automatically drained and the system manually moved to the next riser before the next irrigation set begins. When the side-roll is moved, the drive engine must be manually started to move the irrigation line 60 feet to the next set location. Once the side-roll is advanced to the end of the field, the side-roll is then moved back to its original position to begin the cycle again.

A livestock fence would be used around the pasture area to prevent livestock in the pasture area from traveling out across the rest of the wildlife enhancement areas on the property (immediately north and west of the pasture area). A wildlife-friendly fence would be used to allow mule deer and antelope to safely enter and exit the pasture area. An approximately 100-gallon temporary watering trough would also be provided in the pasture area for livestock watering. This would be served by a 1-inch buried water line tapped off of the water supply system at the Energy Facility and would be routed and buried in the same trench as the buried irrigation pipeline.

Evaporation Pond. In the unlikely event that process wastewater management by irrigated pasture beneficial use does not function as designed, an optional backup of a 20-acre evaporation pond sized to store approximately 7 MG and lined to protect groundwater would be used to manage process wastewater. The evaporation pond alternative is a contingency only and it would not be built until such time as it is determined that process wastewater management by irrigated pasture beneficial use does not function as designed. If the need for the evaporation pond occurs, the water treatment system at the Energy Facility would be changed to incorporate a RO system to increase the cycling of the water and to reduce the quantity of wastewater to be discharged to the evaporation pond.

The evaporation pond would be designed to operate passively. A wastewater pipeline would directly route wastewater from the Energy Facility to the evaporation pond. The evaporation pond would be designed and sized to contain total suspend solids from the wastewater for the life of the Energy Facility with minimal, if any, requirement for sediment removal.

The evaporation pond would be designed to include a composite liner system for containment of the wastewater and suspend solids. Bentonite would be added to the soil at the base of the evaporation pond, mixed to a depth of approximately 12 inches, and then compacted to achieve a permeability of greater than or equal to 1×10^{-6} centimeters per second (cm/sec). An alternative to the bentonite-treated soil would be to use a bentomat geotextile system. The bentomat geotextile system is available with a permeability as low as 5×10^{-9} cm/sec. A 60-mil high-density polyethylene (HDPE) liner would be placed over the bentonite-treated soil or the bentomat geotextile system, to form the top layer of the composite liner system. The evaporation pond would be netted to prevent access by birds and surrounded by a chain-link fence to prevent wildlife access. A spray enhancement system may be used to increase evaporation.

Storing and Hauling to Wastewater Treatment Plant. If this alternative were to be selected, process wastewater would be managed by storing and hauling to a WWTP for disposal. The project proponent has contacted the two municipal WWTPs in Klamath Falls—the South Suburban Sanitary District and the City of Klamath Falls Sanitary District. The ability of these two WWTPs to accept wastewater from testing and commissioning of the Energy Facility and the wastewater from operation of the Energy Facility is presently being evaluated. According to managers at both facilities, each would be required to evaluate whether they can meet the U.S. Environmental Protection Agency (EPA) categorical standard to accept industrial waste or whether local ordinances provide for acceptance of truck-hauled wastewater. During the life of the Energy Facility, other WWTPs may be constructed or considered for management of wastewater generated at the Energy Facility. The project proponent would arrange with a trucking company to routinely haul the wastewater stored in the wastewater storage tanks at the Energy Facility to the WWTP.

Sanitary Wastewater

During operations, sanitary wastewater from restroom and shower facilities would be routed to an onsite septic tank, which would discharge to a leach field**.** Approximate flows of up to 1,500 gallons per day or about 1 gallons per minute (gpm) are expected. A permit from either Klamath County or the Oregon Department of Environmental Quality (ODEQ) would be required. The permit process requires a site evaluation to be conducted to determine whether the location of the septic field is appropriate for sewage disposal. During construction, portable toilets would be provided for onsite sewage handling and they would be pumped and cleaned regularly by a licensed contractor.

Stormwater Management

While stormwater is not considered wastewater, stormwater would be managed at the Energy Facility by a 4.7-acre infiltration basin and therefore would be covered under a Water Pollution Control Facility (WPCF) permit. Under the preferred alternative, there would be no discharge of stormwater from the Energy Facility into surface waters, stormwater drainage ditches, or irrigation canals.

Stormwater would be managed through three separate systems, including the plant drainage system, the storm sewer system, and the stormwater run-on diversion system. Figure 2-3 shows a schematic of the three separate and segregated systems designed to handle stormwater during Facility operations. The figure shows individual drainage systems as well as a breakdown of the drains connected to each system. The individual drainage systems are described in more detail below.

Plant Drains System. A dedicated plant drains system would be designed and constructed at the Energy Facility to segregate stormwater that comes in direct contact with plant components from the storm sewer system, thus preventing runoff in the plant drains system from reaching the stormwater pond or the infiltration basin. This design would be accomplished by separating the runoff from drains with the potential to come in contact with pollutants from the remainder of the storm drainage system. Drains in areas with the potential for contact with pollutants from materials used or stored at the Energy Facility would be routed to the segregated plant drains system, which would discharge to an oil/water separator. This system includes drains inside buildings and enclosures and drains from the interior of spill containment berms. The resulting oil/water separator discharge water would be routed to a wastewater collection basin and then pumped back to the raw water tank for use as process water. No stormwater collected by the segregated plant drains system would be routed to the stormwater pond or infiltration basin.

The wastewater collection basin would be a concrete sump located in an accessible location so it can be inspected without interfering with Facility operations. It would hold approximately 5,000 to 10,000 gallons.

The oil from the oil/water (O/W) separator would be contained in the oil/water separator itself. The O/W separator would include a level indicator with an alarm that would alert the operations staff when it needs to be emptied. At that point, a licensed contractor would pump the oil out and haul it offsite for proper disposal.

The dedicated plant drains system would include the following:

- Combustion turbine enclosure floor drains
- Steam turbine area foundation and floor drains
- HRSG foundation and stack floor drains
- Warehouse/maintenance building floor drains
- Administration building floor drains

Stormwater Sewer System. Stormwater that falls inside the fence line of the Energy Facility that is not routed to the plant drains system described above, would be collected in the storm sewer system. The collection of rainfall runoff in this system is limited to parking lots, roof drains, graveled areas and vegetated areas. This storm sewer system would consist of ditches, culverts, and piping as required that is routed to the stormwater pond. From the stormwater pond there are two alternatives for discharge of the stormwater. The preferred alternative is to discharge the stormwater into a 4.7-acre infiltration basin. The second alternative is to discharge the stormwater through a ditch adjacent to the Energy Facility access road and into the West Langell Valley Roadside ditch where it would eventually enter the High Line Levee Ditch and then into the Lost River. These alternatives are described in more detail below.

Stormwater Pond. The captured runoff from the Energy Facility in the storm sewer system would be conveyed to a 1.5-acre, 750,000-gallon stormwater pond, located in the southeast corner of the Energy Facility (see Figure 2-4). This stormwater pond would serve two purposes: 1) provide pretreatment of the runoff before it enters the infiltration basin, and 2) provide temporary storage should unwanted material make its way into the stormwater.

The stormwater pond would provide a wide spot in the stormwater flow path. This wide spot would reduce the flow velocity of the stormwater, allowing suspended sediment to settle out. The operating life of the infiltration basin would be increased by removing the sediment.

A ditch would be constructed from the toe of the fill for the Energy Facility over to the infiltration basin to convey stormwater in the stormwater pond to the infiltration basin. An 18-inch-diameter discharge pipe would be installed through the southern end of the dyke of the stormwater pond. The outlet would discharge into the ditch. The pipe would include a manually operated valve that would normally be closed. The 18-inch-diameter discharge pipe would drain the 2.3 acre-foot stormwater pond if it were full in approximately 5 hours.

The stormwater pond is not designed to detain a 100-year, 24-hour storm. It is able to detain only approximately 34 percent (2.3 acre-feet divided by 6.7 acre-feet). The spillway would be sized to handle the peak flow from the 100-year, 24-hour storm, which is approximately 112 cubic feet per second (cfs). The dyke of the stormwater pond would include a 2-foot-deep, concrete-lined flume directly above the discharge pipe. This flume would act as an emergency spillway for storms greater than the volume of the stormwater pond. The spillway routes stormwater overflow to the ditch that directs water into the infiltration basin. The 112-cfs peak flow occurs for less than 15 minutes and is not representative of the average flow for a 100-year storm.

Infiltration Basin Alternative (Preferred). Though not accounted for in the preliminary basin sizing, evaporation of the collected stormwater would occur during the summer months. Vegetation would be planted in the bottom of the infiltration basin to help to improve the infiltration functions and protect these surfaces from rain and wind erosion. There are three primary reasons to vegetate the basin with native grasses or other suitable vegetation:

- The #1 cause of soil erosion in Klamath County is wind on barren soil.
- The infiltration basin would be a collection basin for wind blown soil and noxious weed seeds. Although the soil may become resuspended by the wind, some seeds would germinate and overtime the basin would be vegetated by noxious weeds and require greater maintenance to remove weeds.
- Vegetation would help uptake any nutrients or potential pollutants that may be in the stormwater.

A chain-link fence would be installed around the infiltration basin to prevent debris, such as wind-blown vegetation or litter, from entering and settling on the basin bottom. The fence would also serve to prevent unauthorized personnel or wildlife from entering the basin. A gate would be installed in the fence to allow access for maintenance personnel and equipment. An access road would be constructed from the access road to the Energy Facility over to the infiltration basin (see Figure 2-4).

Runoff calculations were performed using the TR-20 hydrologic model. This model was developed by the Soil Conservation Service and the U.S. Department of Agriculture. The 100-year, 24-hour storm event was used to size the infiltration basin. This return event is consistent for the design of stormwater retention systems. The probability of a 100-year storm event to occur in any one year is one percent.

The infiltration basin would be located adjacent to the Energy Facility on Claimus series loam soil. The NRCS (Natural Resources Conservation Service) Soil Survey for Klamath County lists the saturated infiltration rate for this soil as 0.6 inch per hour (in/hr) to 2.0 in/hr. The infiltration basin was sized using the lower value of 0.6 in/hr. Using this lower infiltration value provides a conservative infiltration basin size. Table E-1.1 summarizes the preliminary infiltration basin sizing.

The primary controlling factor in sizing the infiltration basin is the surface area of the basin bottom, the depth of water storage, and one foot of freeboard. One foot of freeboard is a typical design standard for stormwater ponds. Over designing the infiltration basin reduces the chances of the water over-topping the infiltration basin should a storm, larger than the 100-year event occur or if back-to-back smaller storm events occur. Based on the over-design of the basin configuration for this project, the additional one foot of free board provides approximately 40 percent additional storage volume that could be filled by stormwater before overtopping would occur. A 48-hour drawdown period of the 100-year stormwater volume was used for sizing the infiltration basin and is consistent with the design requirements of similar functioning ponds, such as an extended dry detention pond. This draw-down period reduces the risk of stormwater overtopping the infiltration basin should back to back storm events occur. Drawdown duration would be less than 48 hours for the more frequent return storm events.

Offsite Stormwater Diversion System. Stormwater diversion ditches would be installed on the north and west sides of the Energy Facility to divert stormwater form undisturbed areas adjacent to the Energy Facility from flowing onto the Energy Facility. These diversion ditches would direct water into existing natural drainage system or into the drainage ditch along West Langell Valley Road. Runoff to the south and east of the Energy Facility would naturally drain away from the Energy Facility.

2.2.8 Related or Supporting Facilities

Related or supporting facilities include the water supply system (wells and pipeline), natural gas pipeline, electric transmission line, and temporary construction and parking laydown areas.

Water Supply System

Water would be needed by the proposed Energy Facility to generate steam for the combined-cycle operation. The water supply system would consist of water supply wells and a 2.8-mile water supply pipeline that would connect to two 1.1-MG raw water storage tanks at the Energy Facility.

Water Supply Wells. The water supply wells would consist of an existing well and two additional water supply wells located along East Langell Valley Road (Figure 2-2). The existing well, known as the Babson well, was originally drilled to depths exceeding 5,000 feet for oil and gas exploration in the 1920s and is currently open to a depth of 2,050 feet. The two additional water supply wells would also be constructed to withdraw water from this deep aquifer, which is isolated from the shallow zone aquifer and from surface water. Construction would result in temporary disturbance to 1.0 acre of pasture for parking and laydown. An additional 0.3 acre of pasture would be permanently disturbed during the 30-year operating life of the Energy Facility.

An aquifer test was performed in the summer of 2002 (CH2M HILL, 2002). The Babson well was pumped at an average rate of 6,800 gpm for approximately 30 days. An expanded observation well network (31 different locations) was used that included both shallow wells and deeper irrigation wells in Langell Valley, Yonna Valley, Swan Lake Valley, Malin, and Klamath Falls. There was a hydraulic response in two nearby wells in the observation well network attributable to a leaking well packer. This aside, the data do not indicate that the deep system is in hydraulic connection to a shallow aquifer system. A reconstructed well should eliminate the minor response observed. No hydraulic response was observed at Bonanza Big Springs.

Deep aquifer response suggests extremely high aquifer transmissivity and supply: at the end of the 30-day pumping period, water levels had recovered to the pretest static level within 5 minutes. These observations show that the roughly 294 MG withdrawn for this test were insignificant relative to the rate and volume of water available to the Babson well.

Water requirements for the Energy Facility, under annual average conditions with supplemental duct firing, would be approximately 36 gpm for one 580-MW block or 72 gpm for the 1,160-MW arrangement from the Babson well. Under maximum consumption conditions with supplemental duct firing, that rate increases to 104 gpm for one 580-MW block or 210 gpm for the 1,160-MW arrangement.

Two additional water supply wells would be installed near the Babson well. One would be located up to 50 feet northwest and the other up to 500 feet southeast of the existing Babson well. These maximum distances for well locations were included in the OWRD water right application as additional points of diversion. Each of the three wells (the Babson well and the two additional water supply wells) would be designed to produce the maximum, instantaneous rate of 210 gpm. Flexibility to pump 100 percent of the required maximum, instantaneous rate is necessary in the event that two wells are offline simultaneously because of malfunction or scheduled maintenance.

Water Supply Pipelines. Water from the well system would be pumped through a 2.8-mile, 6-inch-diameter water supply pipeline to a 1.1-MG raw water supply tank at the Energy Facility site.

The 2.8-mile water supply pipeline would be constructed within a temporary, 60-foot-wide easement on land under ownership options by the project proponent, except for portions of the route that cross Klamath County roads. The route of the water supply pipeline would cross two Klamath County roads: East Langell Valley Road and Teare County Road 1161. In addition, the water supply pipeline would cross an irrigation canal operated by the Langell

Valley Irrigation District in three locations. The crossings would be conventionally bored underneath the public roads and irrigation canal. The rest of the water supply pipeline would be constructed by open trench methods. The pipeline would be installed in a 36-inch-wide trench at a depth of about 4 feet.

Construction. In the areas where conventional bores would occur, additional temporary work space would be required on both sides of the road or irrigation canal. Excavations would be larger than in the open trench sections to provide room for workers to safely work down in the excavations. The excavations would be approximately 15 feet deep. The additional work space would be necessary to excavate a safe ditch and store the excavated soil.

Construction would result in temporary disturbance to 10.2 acres of juniper-sage scrub, 1.4 acres of agricultural fields, 6.3 acres of pasture, 0.8 acre of fallow field, and 0.7 acre of ruderal habitat for a total of 19.4 acres. There would be no permanent disturbance for the water supply pipelines because the construction easement would be restored and revegetated.

Figure 2-5 shows a typical construction configuration of the water supply pipelines. The trench would be backfilled with pipe zone material and then with native soil up to the original grade. Equipment used would include cranes, excavators, supply trucks, boom trucks, and line trucks.

Natural Gas Pipeline

A new 4.1-mile, 20-inch-diameter pipeline would be required to supply natural gas to the Energy Facility. The pipeline would connect to an existing PG&E Gas Transmission Northwest (GTN) gas transmission system at the Bonanza Compressor Station. The proposed alignment would be located along the right-of-way (ROW) of existing Klamath County roads (Figure 2-2). The project proponent would be responsible for constructing a gas measurement station to be located either at the Energy Facility site or at the PG&E GTN Bonanza Compressor Station. PG&E GTN would be responsible for the final gas interconnection (side tap installation) with its existing pipelines.

Easement options have been obtained along the pipeline alignment for a temporary 80-foot-wide construction easement needed for equipment staging and material laydown along the pipeline alignment. The easement would be immediately adjacent to and along the Klamath County ROW for Harpold County Road No. 1097 and West Langell Valley Road No. 520. The alignment of the natural gas pipeline would cross the public roads in three places. These crossings would be conventionally bored underneath the public roads. The rest of the natural gas pipeline would be constructed by open trench methods. The natural gas pipeline would be installed in a 36-inch-wide trench at a depth of about 4 feet. Additional temporary work space of 40 feet (for a total of 120 feet) would be required along the north side of West Langell Valley Road near the Energy Facility site, where the natural gas pipeline route goes through an approximate 2,200-foot section of steep topography. The extra width would be needed for soil storage when leveling the easement to create a safe working platform for workers and equipment. Construction of the natural gas pipeline would result in temporary impacts to 9.0 acres of juniper-sage scrub, 23.9 acres of agricultural field, 0.8 acre of pasture, 3.5 acres of fallow field, 3.0 acres of ruderal habitat, and 3.6 acres of developed land for a total of 43.8 acres that would be restored after construction.

Figure 2-6 shows a typical configuration of the natural gas supply pipeline construction. The trench would be backfilled with pipe zone material and then with native soil up to the original grade. Equipment used along the pipeline alignment would include light and heavy trucks, excavators, bulldozers, graders, cranes, air compressors, welding machines, and power hand tools. Some specialized boring equipment would be used to do the conventional bores under the existing roads and the irrigation canal.

Electric Transmission Line

The proposed Energy Facility would include construction of a new 7.2-mile-long, 500-kV, alternating current (AC) electric transmission line running south from the Energy Facility to an interconnection at BPA's Captain Jack Substation (Figure 2-2). The final route and configuration of the new transmission line (for example, exact number of transmission towers, transmission tower heights, and location of transmission towers) would depend on final design and engineering, geotechnical, and environmental considerations.

Transmission Towers. Approximately 38 transmission towers would be required. The transmission towers would consist of steel lattice structures assembled in sections near the transmission tower site (Figure 2-7). Typical transmission towers would range in height from 100 to 165 feet, with most towers in the 105- to 110-foot range. On average, the towers would be spaced approximately 990 feet apart, with a range from 380 to 1,500 feet to span sensitive areas. Transmission towers would rest on four concrete footings, each about 4 feet in diameter. Allowing room for access and maintenance workspace around the footings would result in a permanent footprint disturbance of approximately 60 feet by 60 feet at each transmission tower.

At nine transmission tower locations, approximately 100 feet by 150 feet of additional, permanent space would be required to ensure safety for vehicles and equipment. Footings would be placed in holes that are excavated, augured, or blasted. The design of the footings would vary based on soil properties, bedrock depth, and the soundness of the bedrock at each transmission tower site. Construction of the transmission towers would result in permanent loss during the 30-year operating life of the Energy Facility of 3.5 acres of juniper-sage scrub, 0.6 acre of sagebrush-steppe, 0.8 acre of ponderosa pine, 0.1 acre of unimproved pasture, and 0.5 acre of fallow field for a total of 5.5 acres.

Conductors and BFDs. Typically, 500-kV AC transmission lines require three sets of wires (or "conductors"). Each set is referred to as a phase, and typically consists of a pair of bundled aluminum cables. One or two "shield wires" are placed near the top of the transmission structure, above the conductors, to shield the towers from lightning strikes. To prevent electrocutions, conductor wires would be spaced further apart than the wing span of a large birds (24 feet on the vertical and 25 feet on the diagonal) (APLIC, 1996). The top groundwire would be fitted with BFDs to visually enhance the wire and subsequently deflect birds from colliding with hard to see wires. Annual monitoring of the lines would be conducted to determine if the lines are a significant impact to waterfowl and special-status birds that forage or nest in the area.

Access Roads. A permanent access road would be required for construction and to access the new electric transmission line for maintenance during operation. The access road would be designed for use by cranes, excavators, supply trucks, boom trucks, and line trucks. The access road would be surfaced with gravel. Approximately 6.6 miles of new access road would be required. The access road would be approximately 15 feet wide, and grades would be less than 15 percent. To minimize clearing, the access road would remain within the electric transmission line ROW where possible. Construction of the electric transmission line access roads would result in permanent conversion of 28.1 acres of juniper-sage scrub, 9.8 acres of sagebrush-steppe, 11.6 acres of ponderosa pine, 2.0 acres of unimproved pasture, and 0.3 acre of fallow field for a total of 51.8 acres. Where temporary roads are used, any disturbed ground would be repaired and the area would be revegetated with the appropriate native species to minimize erosion.

Vegetation Management. To minimize fire hazards for safe and uninterrupted operation of the electric transmission line, vegetation more than 10 feet tall would be cleared or trimmed within the 154-foot easement. The easement would consist of 79.5 acres of juniper-sage scrub, 22.3 acres of sagebrush-steppe, 23.7 acres of ponderosa pine, 2.1 acres of unimproved pasture, and 6.4 acres of fallow field for a total of 134.0 acres. Removal of juniper trees would provide an overall benefit to the habitat by improving understory growth of grasses and shrubs.

Clearing may include removal of vegetation or managing vegetation so that it does not grow above 10 feet in height. Considerations that influence the amount and type of clearing include vegetation species, height and growth rates, ground slope, wind and snow patterns, conductor elevation above ground, and clearance distance required between the conductors and other objects. Some form of selective vegetation removal may be required at the edge of the 154-foot easement. Leaning or diseased trees that could fall into the electric transmission line or pose a threat to reliable operation would be removed as necessary. At transmission tower sites, trees, brush, stumps, and snags would be removed, including root systems. After construction, vegetation management would be necessary, and would include controlling noxious weeds and managing growing vegetation in and adjacent to the easement. Vegetation management would consist of manual, mechanical, biological, and chemical methods.

Construction Parking and Laydown Areas

During construction, temporary parking and laydown areas would be required as follows:

- At the Energy Facility site there would be four areas for construction parking and laydown totaling 71.0 acres.
- In the water supply well area, the construction parking and laydown area would total 1.0 acre.
- Along the electric transmission line, there would be 7.6 acres of staging and construction areas.

2.2.9 Construction Schedule

Based on conditions of the electric power market after approval of the site certificate application, the project proponent may decide to construct the Facility in one phase or two phases. If the Facility is constructed in two phases, construction of the second phase may start up to 2 years after the first phase starts commercial operation.

If the Facility is constructed in one phase, construction would be expected to take 23 months. If the Facility is constructed in two phases, the first phase of construction would be expected to take approximately 18 months.

Because the conditions of the power market fluctuate and are volatile, the project proponent may choose not to start construction of the Facility until 3 years after the site certificate application is approved.

TABLE 2-1
Permanent and Temporary Disturbance by Habitat Type

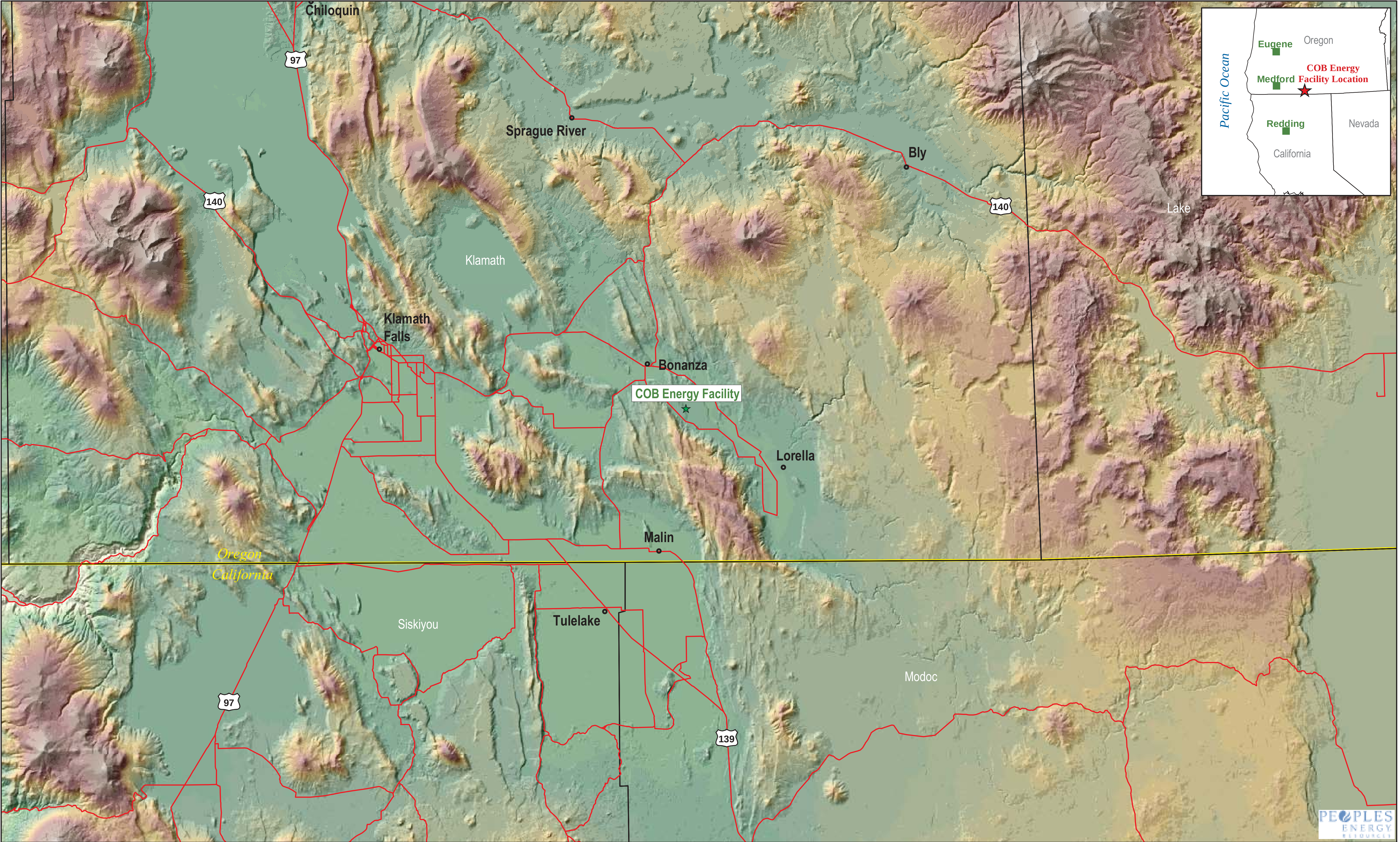
Feature	Total	Juniper-Sage	Sage-Steppe	Pine	Ag Field	Pasture	Unimproved Pasture	Fallow	Ruderal	Developed	Sensitive Biological Resources Affected
Permanent Effects to Habitat During the 30-Year Operating Life of the Energy Facility Site											
Energy Facility Site	50.6							50.6			Loss of marginal upland bald eagle foraging habitat during the 30-year operating life of the Energy Facility and from temporary disturbance during construction activities. After site restoration activities, the Energy Facility would be revegetated and restored to conditions suitable for agricultural use.
Permanent Effects to Habitat for the Related or Supporting Facilities During the 30-Year Operating Life of the Energy Facility											
Alternative wastewater evaporation pond	20.0							20.0			Potential toxicity to wildlife. The evaporation pond would be netted with a 1-inch square-knotted polypropylene netting to prevent bird access. Also, the evaporation pond would be enclosed with a chain-link fence to prohibit wildlife access.
Water supply well system	0.3					0.3					Loss of marginal upland bald eagle foraging habitat during the 30-year operating life of the Energy Facility and from temporary disturbance during construction activities.
Electric transmission line towers and access roads	57.3	31.6	10.4	12.4			2.1	0.8			Potential for bald eagle collisions with new electric transmission line and loss of upland bald eagle foraging habitat. Potential for increased road kill that increases carrion forage for bald eagle. Bird flight diverters would be installed on top groundwires of new electric transmission line. Awareness training would be provided to employees responsible for using the access roads to perform maintenance and inspection.
Access road to irrigated pasture *	0.5							0.5			
Subtotal—Related or supporting facilities without evaporation pond	58.1	31.6	10.4	12.4	0.0	0.3	2.1	1.3	0.0	0.0	
Subtotal—Related or supporting facilities with evaporation pond	77.6	31.6	10.4	12.4	0.0	0.3	2.1	21.3	0.0	0.0	
Project Total—without evaporation pond	108.7	31.6	10.4	12.4	0.0	0.3	2.1	51.9	0.0	0.0	
Project Total—with evaporation pond	128.7	31.6	10.4	12.4	0.0	0.3	2.1	71.9	0.0	0.0	
Temporary Effects to Habitat Not Included in the Permanent Effects											
Temporary construction parking and laydown areas	71.0	5.4							65.6		Temporary disturbance during construction to marginal upland bald eagle foraging habitat.
Water supply well system construction parking and laydown area	1.0					1.0					Temporary disturbance during construction to marginal upland bald eagle foraging habitat.
Water supply pipeline construction easement	19.4	10.2			1.4	6.3		0.8	0.7		Temporary disturbance during construction to marginal upland bald eagle foraging habitat.
Natural gas pipeline construction easement	43.8	9.0			23.9	0.8		3.5	3.0	3.6	Temporary disturbance during construction to marginal upland bald eagle foraging habitat.
Irrigation pipeline	5.2							5.2			
Electric transmission line (additional construction and storage areas at each transmission tower)	7.6	3.6	1.8	1.6			0.3	0.3			Potential temporary disturbance to bald eagle nesting and foraging on Bryant Mountain during construction.
Total: Temporary—without evaporation pond	148.0	28.2	1.8	1.6	25.3	8.1	0.3	9.8	69.3	3.6	
Total: Temporary—with evaporation pond	148.0	28.2	1.8	1.6	25.3	8.1	0.3	9.8	69.3	3.6	
Project Total—with evaporation pond	256.7	59.8	12.2	14.0	25.3	8.4	2.4	61.7	69.3	3.6	
Project Total—without evaporation pond	276.7	59.8	12.2	14.0	25.3	8.4	2.4	81.7	69.3	3.6	
Habitat Areas Modified for Related or Supporting Facilities During the 30-Year Operating Life of the Energy Facility											
Clearing within the 154-foot electric transmission line easement (includes the transmission towers and access roads inside the easement)	134.0	79.5	22.3	23.7			2.1	6.4			Modification of upland habitat would occur when vegetation above 10 feet in height within the 154-foot easement would be cleared. Removal of juniper trees would provide an overall benefit to the habitat by improving understory growth of grasses and shrubs.

* If the evaporation pond is the selected alternative, the access road to the irrigated pasture would not be constructed.

TABLE 2-2
Process Wastewater Characteristics

Parameter	Land Application Case	Evaporation Pond Case	Units
PH	7.5-9.0	7.5-9.0	Standard units
Iron	0.14	0.68	mg/L
Copper	0.00	0.032	mg/L
Manganese	0.02	0.044	mg/L
Calcium	28.92	65.6	mg/L
Magnesium	11.74	26.6	mg/L
Sodium	20.12	52.0	mg/L
Potassium	4.22	9.57	mg/L
Boron	0.54	1.22	mg/L
Silica	71.12	183.0	mg/L
Chloride	4.14	15.7	mg/L
Nitrate as N	0.84	1.9	mg/L
Nitrite as N	0.02	0.044	mg/L
Ammonia as N	0.00	0.35	mg/L
Sulfate	6.29	269.8	mg/L
Total Alkalinity	164.12	250.0	mg/L as $CaCO_3$
Fluoride	0.20	0.44	mg/L
Phosphorous	0.05	20	mg/L
Orthophosphate as P	0.05	20	mg/L
Sulfite	1.00	25.0	mg/L
Oil and Grease	0.30	10.7	mg/L
Total Organic Content (TOC)	1.50	69.6	mg/L
TDS [1]	203	1,077	mg/L
TSS	1.00	1.0	mg/L
Phosphonates [2]	0.00	30.0	mg/L
Polyacrylate [2]	0.00	20.0	mg/L
Free Chlorine [2]	0.00	0.20	mg/L

[1] Includes treatment chemicals identified in [2].
[2] Added as treatment chemical.
mg/L = milligrams per liter.



Legend
Roads
Counties
States

N
1 inch equals 6 miles
0 2 4 8 Miles

Figure 2-1
Site Map
Biological Assessment
COB Energy Facility
Bonanza, OR

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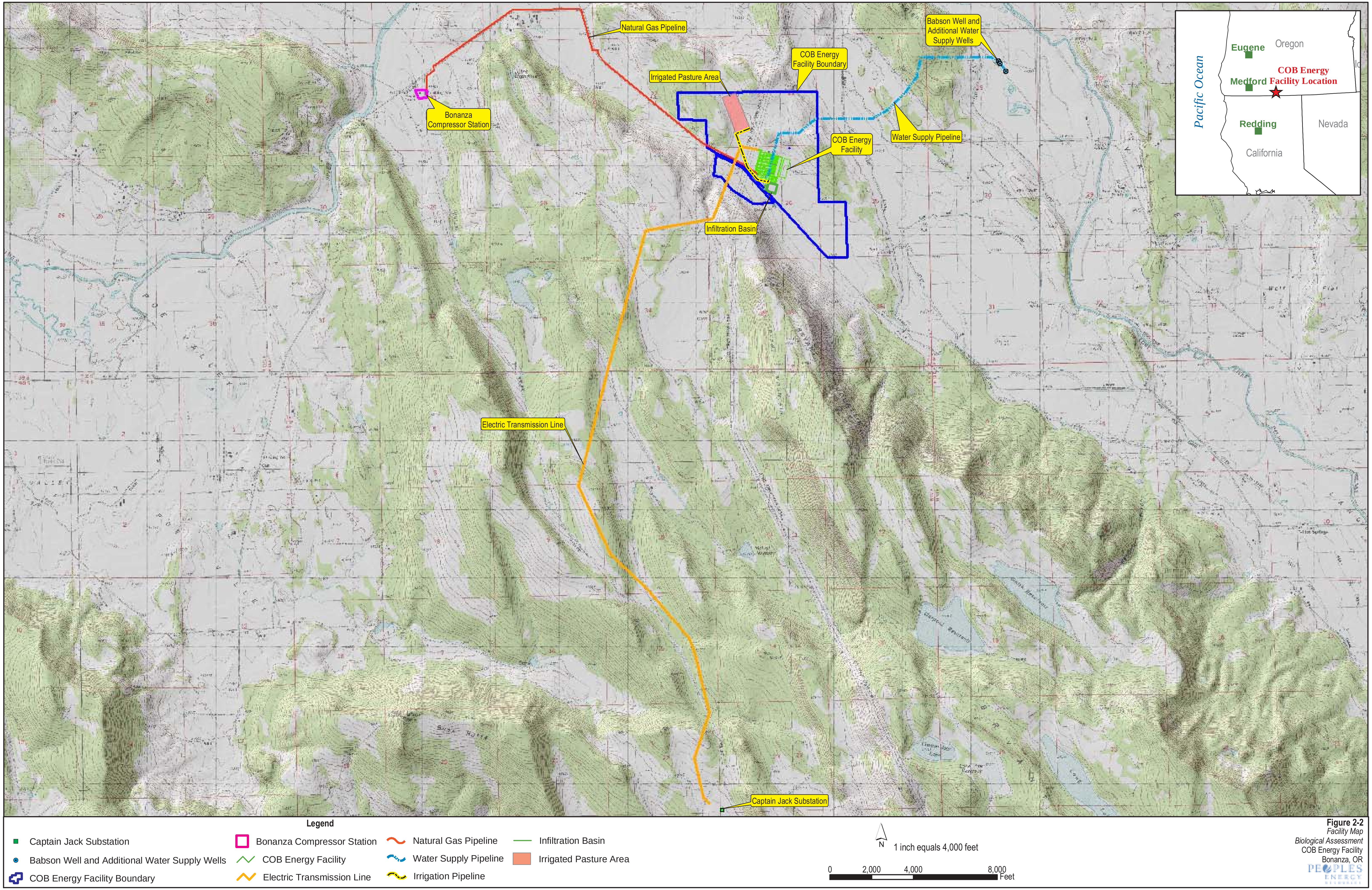

Figure 2-2
Facility Map
Biological Assessment
COB Energy Facility
Bonanza, OR
PEOPLES ENERGY

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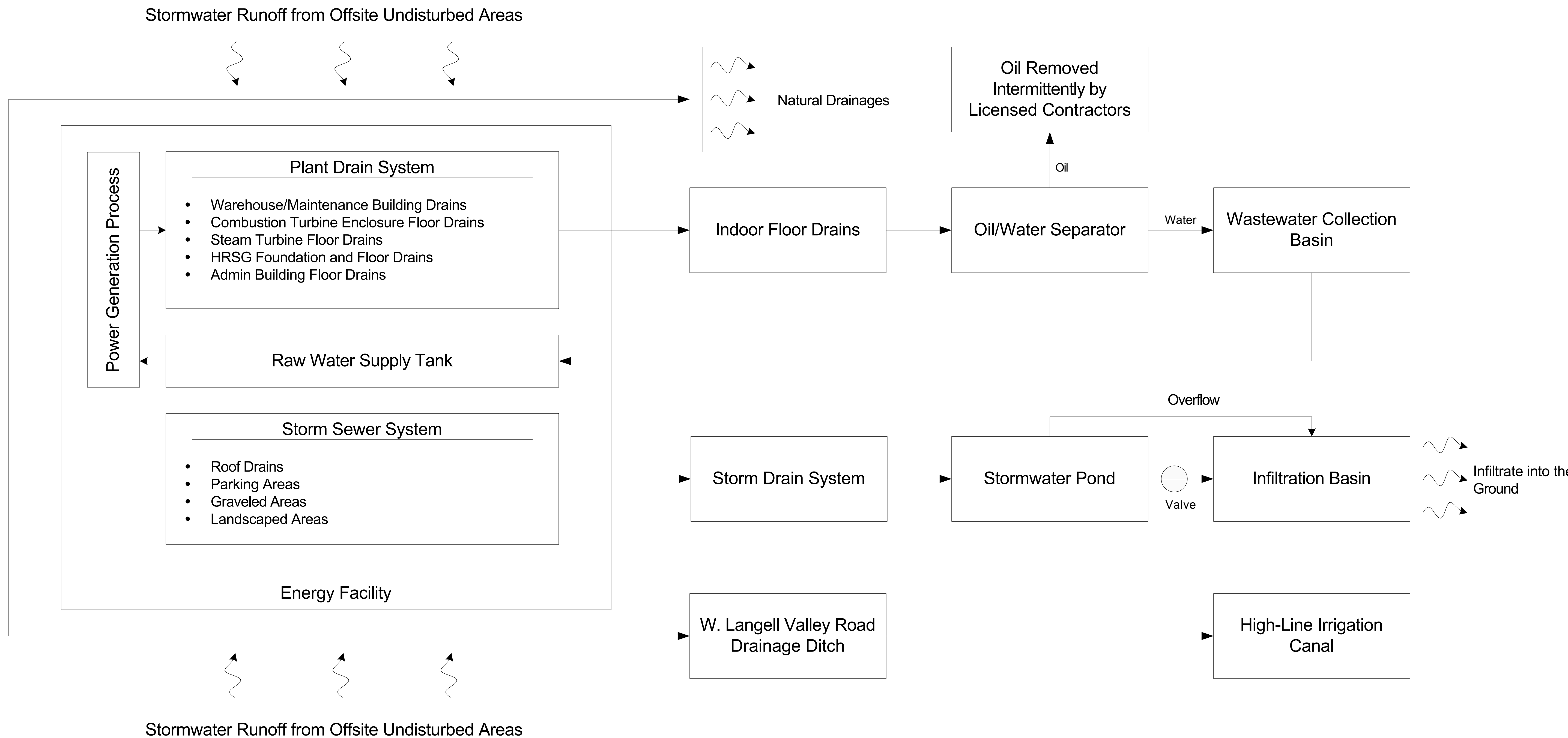

FIGURE 2-3
Stormwater Drainage Flow Schematic
Biological Assessment
COB Energy Facility
Bonanza, OR

PEOPLES ENERGY Resources

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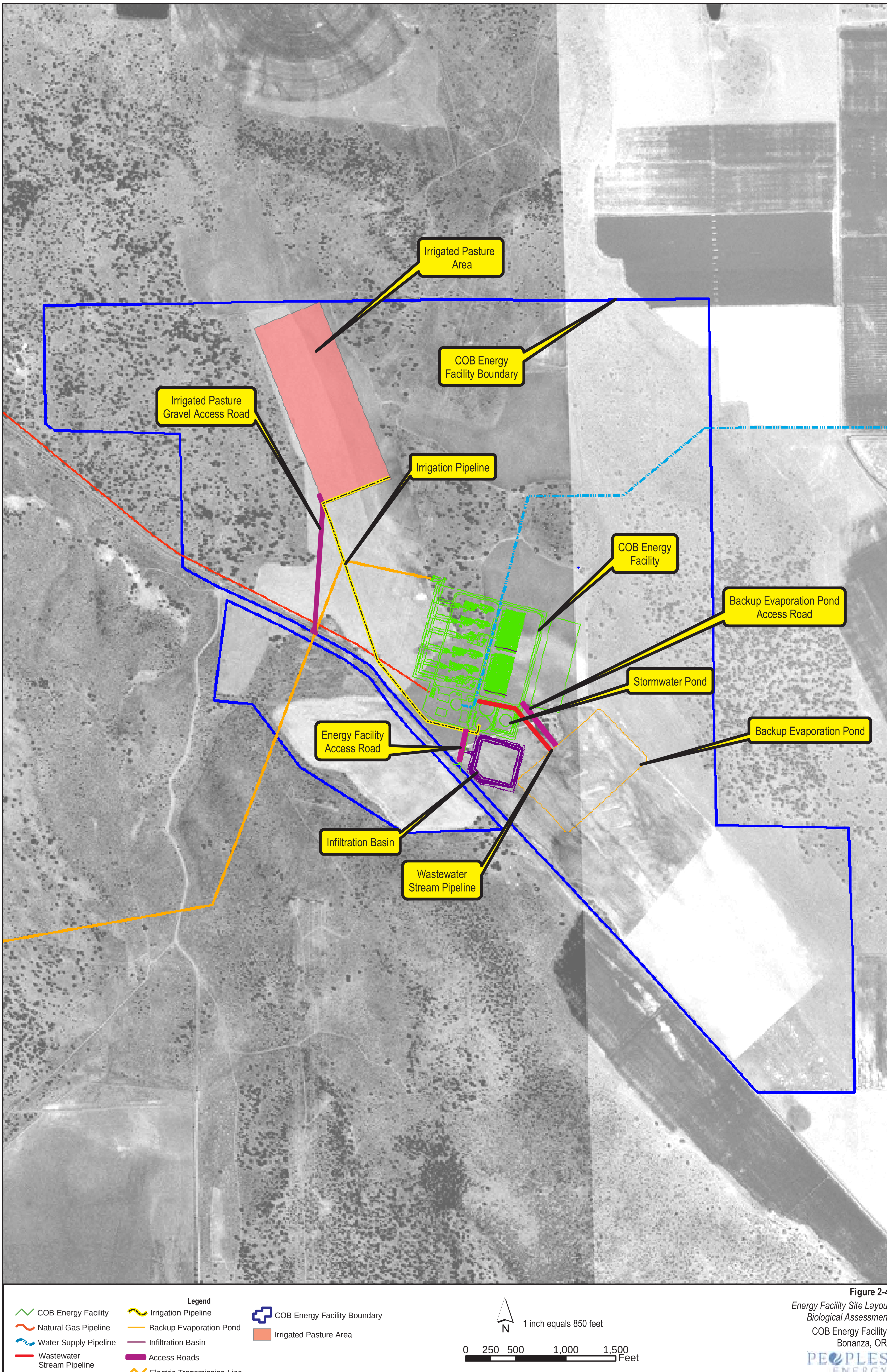

Figure 2-4
Energy Facility Site Layout
Biological Assessment
COB Energy Facility
Bonanza, OR

PEOPLES ENERGY RESOURCES

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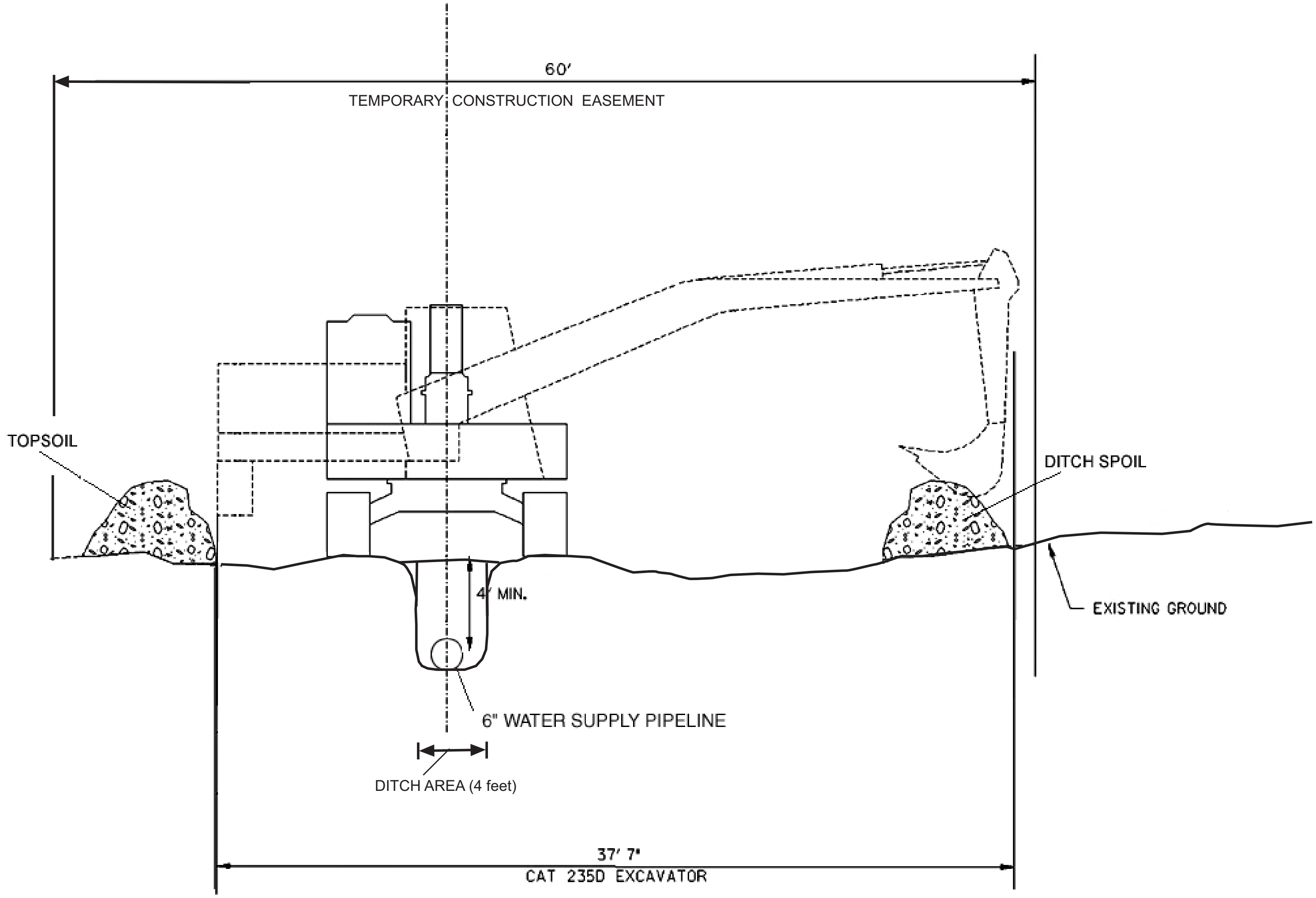
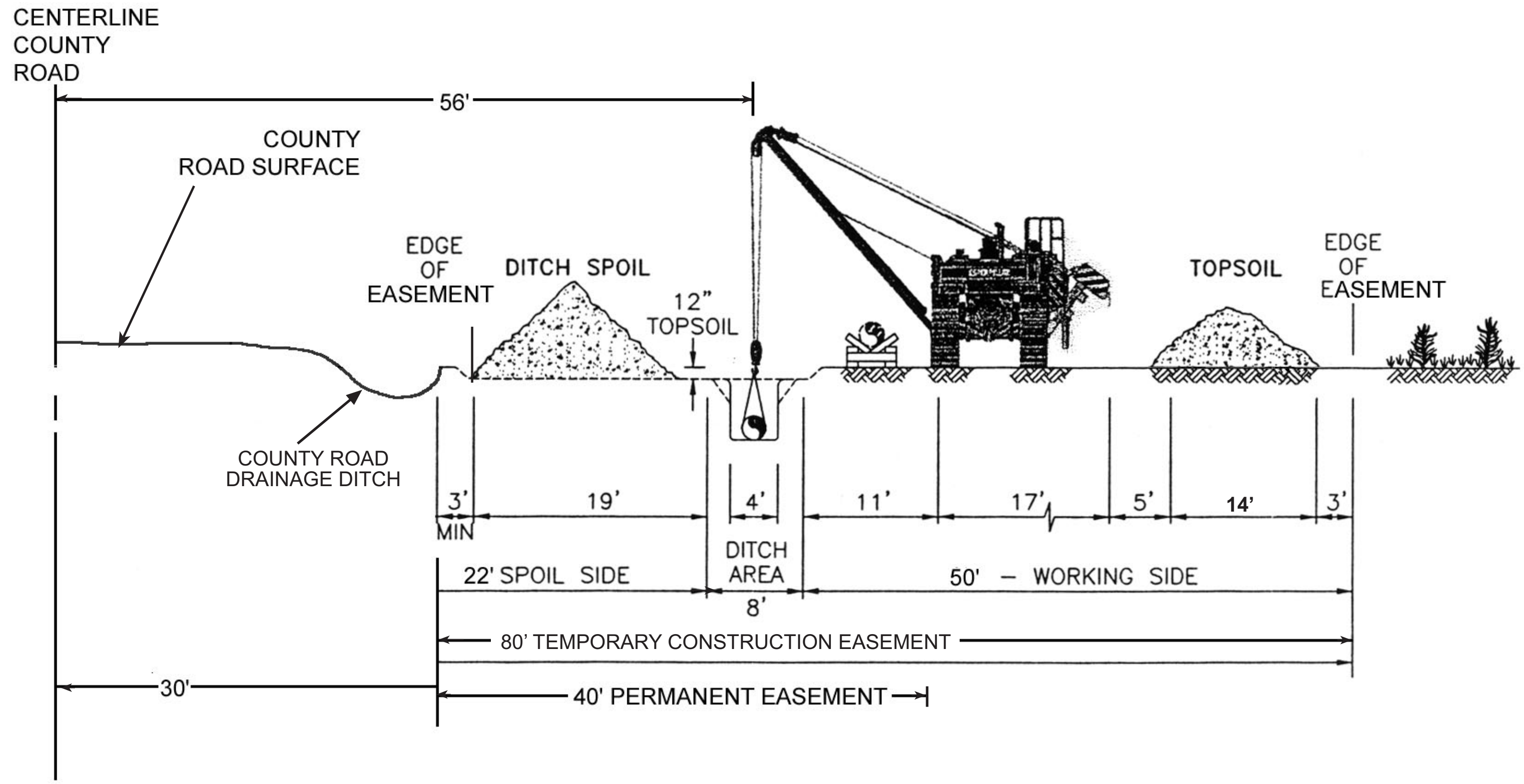


Figure 2-5
Typical Water Supply Pipeline Configuration
Biological Assessment
COB Energy Facility
Bonanza, OR

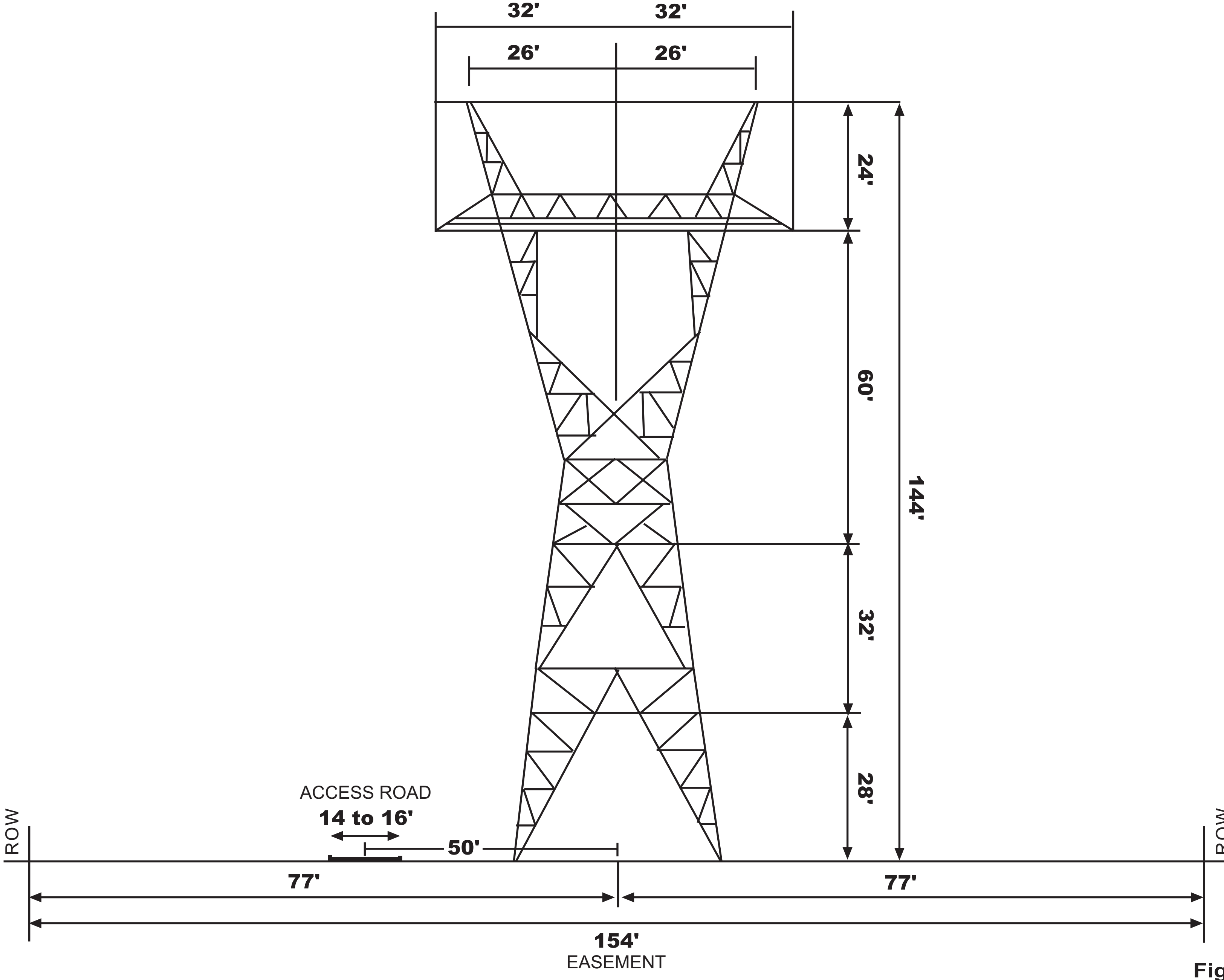
CH2MHILL

PEOPLES ENERGY Resources



Source: (Adapted from *Temporary Right-of-Way With Requirements for Pipeline Construction.* Prepared for The INGAA Foundation, Inc., by Gulf Interstate Engineering. 1999.)

Figure 2-6
Typical Natural Gas Pipeline Configuration
Biological Assessment
COB Energy Facility
Bonanza, OR



NOTES:

1. TRANSMISSION TOWER IS LATTICE.
2. CONDUCTORS COULD BE HORIZONTAL OR VERTICAL.
3. ACCESS ROAD MAXIMUM GRADE IS LESS THAN 15 PERCENT.

Figure 2-7
Typical Transmission Tower Structure
Biological Assessment
COB Energy Facility
Bonanza, OR

CH2MHILL

PEOPLES ENERGY Resources

SECTION 3

Study Methods

This section describes the study methods used to develop the BA.

3.1 Data Review

Before conducting field surveys, several natural resource agencies were consulted and a literature review was conducted to obtain information about sensitive biological resources known to occur or that potentially could occur within the project area. As part of the literature review process, USFWS was consulted regarding special-status species that could occur within Klamath County, and a search was conducted of the ONHP database to provide information on reported occurrences of special-status plant and wildlife species in the project area. Because the route of the electric transmission line crosses land owned and managed by BLM (Figure 2-2), BLM was contacted to obtain a list of sensitive and special interest wildlife and plants. The list was provided on April 30, 2002.

Resource agency biologists at ODFW and the U.S. Forest Service were also contacted regarding site-specific special-status wildlife species with the potential to occur in the project area. Lists of special-status species potentially occurring in the project area that were provided by the natural resource agencies and the project impact analysis for those species are presented in Exhibit P of the site certification application.

Federally listed species with habitat or known distribution in the project area are evaluated for potential impacts from construction, operation, and maintenance activities in the BA.

3.2 Onsite Field Surveys

Reconnaissance-level surveys for the Energy Facility site, the water supply pipelines, and the natural gas pipeline were conducted on October 10 and 11, 2001, to evaluate potential effects of the preliminary project design on sensitive biological resources. Detailed habitat assessment and field surveys for sensitive plants and wildlife potentially occurring in the project area were conducted by the following CH2M HILL staff: Marjorie Eisert (Senior Biologist), Russell Huddleston (Biologist), Debra Crowe (Senior Biologist), Heather Johnson (Mammalian Biologist), and Richard Crowe (Senior Environmental Technician). Surveys of the proposed Energy Facility site and the proposed natural gas, water supply, and electric transmission line alignments were conducted from May 6 to May 10, 2002. Additional rare plant and breeding bird surveys were conducted from June 17 to 20, 2002, and on July 9 and 10, 2002.

Prior to conducting the 2002 biological surveys, the centerlines of the water supply pipeline, natural gas pipeline, and electric transmission line were flagged by surveyors. Habitat surveys were conducted for areas within ¼ mile of the Energy Facility site and the water supply pipeline, natural gas pipeline, and electric transmission line. Aerial photography, topographic maps, visual identification, and field verification at specific locations were used to categorize habitat types. Methodology of detailed field surveys for special-status wildlife and plants within each project feature are discussed below. Plant and wildlife species observed during the surveys are presented in Appendix B.

3.2.1 Energy Facility Site and Process Wastewater Application Areas

The majority of the Energy Facility site lies within unirrigated fallow agricultural fields and was surveyed by driving or walking transects. Areas with natural vegetation, relatively little disturbance, or potential habitat for special-status species (e.g., old farm buildings) were inspected on foot. Selected areas of the fallow barley field, where there was a potential for additional wildlife observations, were also surveyed on foot. Wildlife and identifiable plant species observed on the Energy Facility Site were noted. Trail Master photo stations were established at several locations containing wildlife signs (e.g., scat latrines on rock escarpments, woodrat structures, and near burrow systems in the fallow field) to monitor for cryptic and/or nocturnal species.

3.2.2 Electric Transmission Line

The electric transmission line route was surveyed by walking six meandering transects along the entire length of the alignment. These transects covered approximately 300 feet on either side of the centerline, for a total survey width of approximately 600 feet. Wildlife and plant species observed within the survey corridor were noted. Habitat types were mapped based on the characteristic trees, shrubs, and herbaceous vegetation. Visual estimation and field verification at specific locations was used to categorize habitat types beyond the survey corridor. Aerial photos and topographic maps were used in the field to help identify adjacent habitat areas within ¼ mile of the survey area. These areas were further investigated for potential sensitive wildlife and plant species that potentially could be indirectly affected by the proposed project.

3.2.3 Water Supply Pipeline and Natural Gas Pipeline

The proposed water supply pipeline and natural gas pipeline routes were surveyed by walking meandering transects covering approximately 100 feet to either side of the centerline for a total width of 200 feet. Wildlife and identifiable plant species observed within the survey corridor were noted. Habitat types were mapped based on the characteristic trees, shrubs, and herbaceous vegetation. Visual estimation was used to categorize habitat types beyond the survey corridor. As with the electric transmission line, aerial photos and topographic maps were used in the field to help identify areas that may have been overlooked during the meandering transects. Each of these areas was investigated in the field for potential sensitive species. Active cultivated crops and developed areas along the natural gas supply pipeline were not included in the surveyed area.

SECTION 4

Environmental Setting

This section describes current land use, habitat types, and hydrologic resources in the proposed project area.

4.1 Geological Setting

The proposed project is located in the Klamath Ecological Province (East Cascades Ecoregion) on the eastern side of the Cascade Mountains. This region is characterized by large basins surrounded by ancient lake terraces and basaltic fault block mountains. Elevations range generally range from around 4,000 to 6,500 feet. Regionally the project is located within the Klamath River Basin, which extends from the Williamson River in southern Oregon to the Trinity River in northern California and covers approximately 10.5 million acres. The watersheds included in the Klamath Basin provide habitat for genetically distinct anadromous fishes as well as endemic freshwater species. Approximately 75,000 acres of shallow lakes and fresh water wetlands also provide habitat for numerous species, including the largest wintering population of bald eagles in the lower 48 states. Approximately 80 percent of the migratory birds in the pacific flyway use habitats within the Klamath Basin.

4.2 Current Land Use

The majority of the lowland areas in the Langell Valley have been converted to agricultural use, including cultivated crops and irrigated pastures. The Energy Facility site is unirrigated. The few developed areas included scattered residential, agricultural, and industrial sites, such as farm homes, dairies, the PG&E GTN compressor station, and the Captain Jack Substation. The hills and terraces around the valleys are characterized by juniper woodlands with an understory of low sagebrush, rabbitbrush, native perennial bunchgrasses, and forbs, and are used primarily as open rangeland managed by Federal and private landowners. Selective timber harvesting has occurred in the ponderosa pine forest habitat located along the southern section of the proposed electric transmission line near Bryant Mountain. Linear utilities in the area include three existing transmission lines and the PG&E GTN interstate gas pipeline system.

4.3 Habitat Types in the Study Area

4.3.1 Western Juniper Woodland

Western juniper woodland is the driest forest community in the Pacific Northwest and is generally found in the transition zone between ponderosa pine forest and shrub-steppe habitats. This type occurs widely throughout eastern Oregon on shallow, often rocky soil, at elevations ranging from 1,500 and 6,500 feet, and is widespread on low hills and terraces at elevations between 4,000 and 5,000 feet. It is found on well-drained stony to very stony loams derived from weathered tuff and basalt, as well as on loamy soil derived from lacustrine and alluvial deposits (NRCS, 1985).

Western juniper woodland is characterized by the almost sole dominance of western juniper (*Juniperus occidentalis*) in the canopy layer. Throughout much of this habitat type the trees are generally widely spaced, creating a savanna-like setting with shrub cover between 10 to 40 percent in the understory. In some areas, western juniper creates a woodland or forested habitat with only a few scattered shrubs in the understory. Low sagebrush (*Artemisia arbuscula*) is the dominant shrub in most areas with big sagebrush (*Artemisia tridentata*), desert gooseberry (*Ribes velutinum*), and rabbitbrush (*Chrysothamnus nauseosus*, *C. viscidiflorus*) also found within the shrub layer. Native bunchgrasses such as Sandberg's bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber's needlegrass (*Achnatherum thurberianum*) and squirrel tail (*Elymus elymoides*) make up approximately 5 to 25 percent of the ground cover in most areas. Common native forbs include larkspur (*Delphinium nuttallianum*), lupine (*Lupinus lepidus*), phlox (*Phlox diffusa*), lomatium (*Lomatium* spp.), and alpine waterleaf (*Hydrophyllum capitatum*). Where intensive livestock grazing has occurred in this habitat type, the understory vegetation is relatively sparse and made up of non-native species. Shrubs and native perennial bunchgrasses are either absent or very sparse in these areas.

The majority of western juniper habitat observed during field surveys was along the proposed electric transmission line, with sparse distribution along the natural gas and water supply pipelines (Figure 4-1). Wildlife species observed within the western juniper woodland were typical of species associated with this habitat type. Several raptors including, bald eagles (*Haliaeetus leucocephalus*), red-tailed hawks (*Buteo jamaicensis*), Cooper's hawk (*Accipter cooperii*), sharp-shinned hawk (*Accipiter striatus*), and turkey vultures (*Cathartes aura*) were observed foraging and patrolling this habitat. In addition to raptors, numerous passerines were observed. Common species included ruby-crowned kinglet (*Regulus calendula*), mountain bluebird (*Sialia currucoides*), American robin (*Turdus migratorius*), spotted towhee (*Pipilo maculatus*), lark sparrow (*Chondestes grammacus*), golden-crowned sparrow (*Zonotrichia atricapilla*), house finch (*Carpodacus mexicanus*), and evening grosbeak (*Coccothraustes vespertinus*). A limited number of mammals were observed and included Nuttall's cottontail (*Sylvilagus nuttallii*), California ground squirrel (*Spermophilus beecheyi*), yellow-bellied marmot (*Marmota flaviventris*), bushy-tailed woodrat (*Neotoma cinerea*), coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), and pronghorn antelope (*Antilocapra americanc*). The western fence lizard (*Sceloporus occidentalis*) was the only common reptile observed in this habitat type.

4.3.2 Ponderosa Pine Forest

Ponderosa pine habitats are widely distributed throughout eastern Oregon and often are found adjacent to sagebrush-steppe and western juniper habitat types. Ponderosa pine forests generally occur on dry sites characterized by coarse-textured, well-drained soil at elevations between 1,000 and 6,000 feet. An isolated stand of ponderosa pine was observed along the southern portion of the proposed electric transmission line at elevations between 4,300 and 4,600 feet. This habitat type generally occurs on well-drained, loamy soil derived from weathered sandstone, basalt, and lacustrine sediments (NRCS, 1985).

Ponderosa pine (*Pinus ponderosa*) is the dominant species in the canopy layer of this forested habitat. Western juniper, curl-leaf mountain mahogany (*Cercocarpus ledifolius*), and Klamath plum (*Prunus subcordata*) are present in the lower canopy layer. The soil is covered by a moderate accumulation of duff, with Sandberg's bluegrass and Idaho fescue the most common species in the herbaceous layer, accounting for 10 to 50 percent of the cover. This habitat is considered to have moderately high commercial value (USDA, 1979). The isolated stand observed was surrounded by juniper woodland and appeared to have been selectively logged in the past.

The isolated ponderosa pine stand encountered along the southern end of the proposed electric transmission line represents less than 1.5 miles of the proposed 7.2-mile electric transmission line. In general, there was considerable overlap in the wildlife species observed in the ponderosa pine and western juniper habitats. One notable exception was the siting of a great horned owl (*Bubo virginianus*) along an existing access roadway in this habitat.

4.3.3 Sagebrush-Steppe

Sagebrush-steppe is extensively distributed throughout southeastern Oregon on stony shallow soil at elevations ranging from 3,500 to 7,000 feet. Within the analysis area this habitat type generally occurs between 4,000 and 5,000 feet, adjacent to western juniper habitats on well-drained and stony loams derived from weathered tuff and basalt (NRCS, 1985). Scattered sagebrush–steppe habitat was observed along the proposed electric transmission line.

This habitat is characterized by shrubs. Low sagebrush is the most common species, accounting for 15 to 30 percent of the cover. Big sagebrush and rabbitbrush are also common in some areas. Sandberg's bluegrass is the most common species in the herbaceous layer, accounting for 10 to 20 percent of the cover. Other grasses such as Idaho fescue, Thurber's needlegrass, cheatgrass, and intermediate wheatgrass (*Elytrigia intermedia*) were also present but generally made up less than 5 percent of the cover. Common forbs included blue-eyed Mary, stoneseed (*Lithospermum ruderale*), phlox, buckwheat (*Eriogonum umbellatum*), and fleabane (*Erigeron* spp.).

Sagebrush-steppe supports wildlife species comparable to the western juniper woodland, with the major exceptions being the Pygmy rabbit (*Brachylagus idahoensis*), which was observed at three locations along the proposed electric transmission line (see Exhibit P in the site certificate application).

4.3.4 Ruderal Areas

Ruderal areas were observed along the margins of agricultural and developed areas at elevations between 4,100 and 4,200 feet. In the project area, this habitat type occurs on loamy soil derived from weathered diatomite, basalt, and tuff as well as sandy loams formed from alluvial and lacustrine sediments. The vegetation in these areas is generally sparse and characterized by dominance of non-native species such as cheatgrass, tansy mustard, and clasping pepperweed (*Lepidium perfoliatum*). Native vegetation is either absent or provides only minimal cover.

Ruderal areas were encountered mainly along the proposed natural gas pipeline, which runs adjacent to West Langell Valley Road and Harpold Road and small areas along the proposed water supply pipeline (Figure 4-1). Typical wildlife species encountered were mule deer, turkey vulture, Swainson's hawk (*Buteo swainsoni*), rough-legged hawk (*Buteo lagopus*), mourning dove (*Zenaida macroura*), northern flicker (*Colaptes auratus*), western kingbird (*Tyrannus verticalis*), black-billed magpie (*Pica pica*), American crow (*Corvus brachyrhynchos*), loggerhead shrike (*Lanius ludovicianus*), and western meadowlark. The majority of these wildlife observations were made while the wildlife was moving from one natural habitat to another.

4.3.5 Agricultural Lands

The majority of the lowland areas within the analysis area have been converted to agricultural use. These areas occur on the loamy soil, formed in alluvial and lacustrine deposits on low terraces throughout the analysis area. Agricultural lands include cultivated crops, irrigated pasture, unimproved pasture, and fallow fields.

Cultivated crops areas are intensely managed for agricultural production. Common crops within the analysis area include alfalfa, hay, wheat, barley, and oats. Irrigated pastures are areas that have been disked and planted with livestock forage crops such as intermediate wheatgrass, tall fescue (*Festuca arundinacea*), and Kentucky bluegrass (*Poa pratensis*). Pasture land within the analysis area is used for cattle, sheep, and horses. In the higher elevations and more remote basins, pasture areas are not irrigated. The unimproved pasture areas appear to have been disked at some point and planted with forage grasses such as intermediate wheatgrass, tall fescue, and Kentucky bluegrass. Rabbitbrush and low sage are often present along the margins of unimproved pastures. These habitats are currently used for sheep and cattle grazing. Fallow fields are areas that were recently used for dryland farming of wheat and barley, but are no longer in production. These areas are characterized by a sparse cover (10 to 15 percent) of intermediate wheatgrass and ruderal species such as tansy mustard, clasping pepperweed, blue-eyed Mary, and yellowspine thistle (*Cirsium ochrocentrum*). Most of these lands are currently leased for seasonal cattle grazing.

Wildlife observed within the agricultural lands was similar to the wildlife observed within the ruderal lands. These areas have been altered by human activity and generally support few or no native plant species, but provide habitat for a variety of wildlife species including but not limited to ground squirrels, marmots, a badger and badger sign, kangaroo rats, and pack rats, all of which were observed within these areas.

4.4 Hydrologic Resources

4.4.1 Klamath River Basin

The Energy Facility site lies within the Klamath River Basin. By geographic definition, the Klamath Basin is the area drained by the Klamath River and its tributaries. The Klamath is one of only three rivers that pierce both the Cascades and the Coastal mountain ranges before emptying into the Pacific Ocean. In Oregon, the Klamath Basin occupies more than 5,600 square miles and covers almost all of Klamath County and smaller portions of Jackson and Lake Counties to the west and east. At the California-Oregon border, the Klamath River Canyon marks the Basin's low point and at an elevation of 2,755 feet, is its drain point.

4.4.2 Lost River

The project area is located in the Lost River watershed in the northeastern section of the Klamath Basin, approximately 20 miles east of the Upper Klamath Lake. The Lost River watershed is an interior basin covering approximately 3,000 square miles of southern Oregon and Northern California. The headwaters originate east of the Clear Lake Reservoir in Modoc County, California, and flow approximately 75 miles to the Tule Lake Sump. Seasonal flows in the Lost River are controlled by releases from the Clear Lake Dam and Gerber Reservoir. Historical channel modification, water diversion, and wetland drainage associated with the U.S. Bureau of Reclamation's Klamath Project have resulted in a highly altered system. The Link River is a canal constructed by the U.S. Bureau of Reclamation to connect the Lost River to the Klamath River system as part of the Klamath Basin Project. Water from the Lost River is currently used for domestic and industrial water supply, irrigation, and livestock.

4.4.3 Water Conveyance Features

Aquatic habitats within the survey area included intermittent creeks, freshwater marsh, seasonal wetlands, wet meadows, stock ponds, and agricultural canals.

Several intermittent creeks were observed along the electric transmission line. These creeks were dry at the time of the time of the surveys, but had defined bed and bank features. Most of the drainages contained lava rock substrate and either lacked vegetation or contained only sparse upland vegetation within the channel.

4.4.4 Wetlands

Freshwater marsh habitat was observed approximately 2,000 feet south of the water supply wells and was characterized by a mosaic of perennial, emergent monocots and areas of open water. Species such as cattail (*Typha latifolia*) and bulrush (*Scirpus* sp.) are found in the deeper areas where sedges (*Juncus* sp.) and rushes (*Carex* sp.) are found in the seasonally-flooded areas around the perimeter of the marsh. These wetlands occur on the somewhat poorly-drained soil formed in alluvial lacustrine sediments. A hardpan is present between 20 and 40 inches and the water table is typically shallow, ranging from 1 to 3.5 feet below the ground surface (bgs) (NRCS, 1985).

There were numerous aquatic associated wildlife species observed within the project area. The majority of the observations occurred near the Babson well and along the water supply pipeline route. A freshwater marsh is located approximately 1,200 feet southeast of the Babson well, and several irrigation ditches flow along the proposed water supply pipeline route. The footprint avoids wetland habitats and the Facility affects less than 0.5 acre of wetlands.

The wildlife species observed included pie-billed grebe (*Podilymbus podiceps*), great blue heron (*Ardea herodias*), sandhill crane (*Grus canadensis*), green-winged teal (*Anas crecca*), mallard (*Anas platyrhynchos*), northern shoveler (*Anas clypeata*), American wigeon (*Anas americana*), bufflehead (*Bucephala albeola*), common merganser (*Mergus merganser*), wouldet (*Catoptrophorus semipalmatus*), common snipe (*Gallinago gallinago*), gull (*Larus* sp.), Forster's tern (*Sterna forsteri*), common raven (*Corvus corax*), red-winged blackbird (*Agelaius phoeniceus*), tricolored blackbird (*Agelaius tricolor*), yellow-headed blackbird (*Xanthocephalus*

xanthocephalus), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), and northern oriole (*Icterus galbula*).

4.4.5 Sedge Wet Meadow

Sedge wet meadow habitat is characterized by seasonal inundation, with surface water present during the winter and early spring, but absent by the end of the growing season. This habitat type occurs on soil derived from weathered diatomite, tuff, and basalt (NRCS, 1985). The vegetation is characterized by a dense cover of low-growing monocots such as sedges and rushes. A few forb species such as dock (*Rumex crispus*), mouse-tail (*Myosurus minimus*), and downingia (*Downingia* sp.) were observed along the outer margins during field surveys, but accounted for only a minimal amount of the total vegetative cover. Aquatic buttercup (*Ranunculus aquatilus*) was present where there was open water. This habitat was observed in the project area, with the nearest location approximately 2,000 feet east of the proposed electric transmission line.

4.4.6 Wet Meadow

Wet meadow habitats occurred on poorly-drained clay soil that formed in sediments from weathered tuff and basalt (NRCS, 1985). This habitat is characterized by the presence of surface water during the winter and early spring, and the absence of water during the summer months. Characteristic vegetation includes species such as tufted hairgrass (*Deschampsia cespitosa*), Baltic rush (*Juncus balticus*), and sedges (*Carex* spp.). Some areas have been disked and planted with pasture grasses such as tall fescue, timothy (*Phleum pratense*), and meadow foxtail (*Alopecurus pratensis*). This habitat was observed in the project area, with the nearest location approximately 2,000 feet east of the proposed electric transmission line.

4.4.7 Stock Ponds

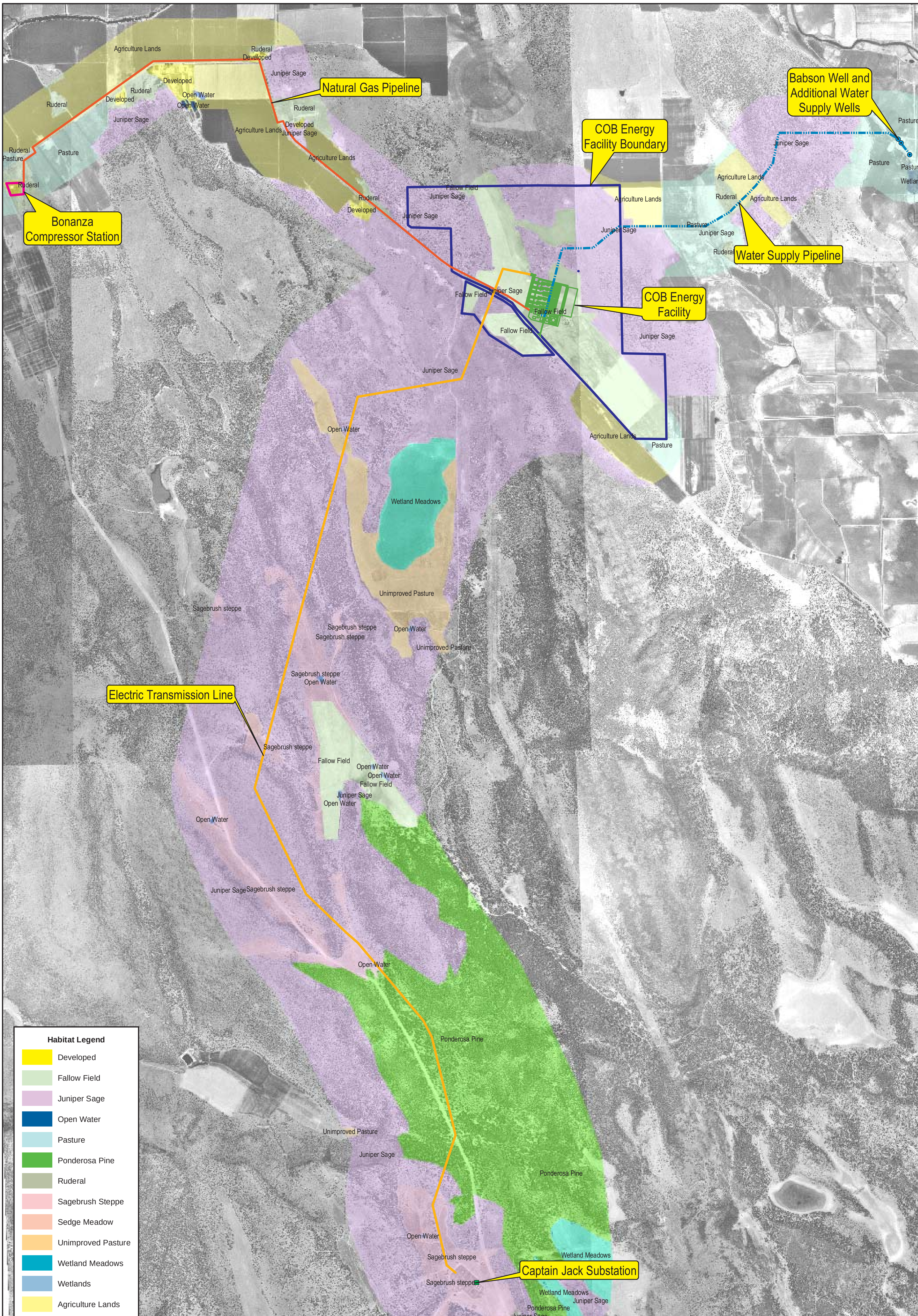
Stock ponds were observed in areas where berms had been constructed within natural drainages to retain water for livestock. The hydrology in these areas was variable, with some ponds containing several inches of water and other areas dry at the time of the survey. Vegetation in these areas included sedges, rushes, aquatic buttercup, and dock. Stock ponds were observed in several areas along the electric transmission line, but none were located within the ROW.

4.4.8 Agricultural Drainages

Several irrigation canals have been constructed to facilitate surface drainage and water transport for agricultural crops and pasture lands in the basin areas. These channels appear to be routinely maintained and were largely devoid of vegetation.

Irrigation canals were observed in the following locations:

- Along the route of the water supply pipeline between the water supply wells and the Energy Facility, the pipeline would cross an irrigation canal in three locations.
- The route of the natural gas pipeline would cross an irrigation canal in one location.



Legend

- Captain Jack Substation
- Babson Well and Additional Water Supply Wells
- COB Energy Facility Boundary
- Bonanza Compressor Station
- COB Energy Facility
- Electric Transmission Line
- Natural Gas Pipeline
- Water Supply Pipeline

N

1 inch equals 2,750 feet

Figure 4-1

Habitat Types
Biological Assessment
COB Energy Facility
Bonanza, OR

PEOPLES ENERGY RESOURCES

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SECTION 5

Species Accounts and Status

Federally listed species are addressed in this section. Federal and state candidate or species of concern, state-listed species, and special wildlife corridors or other sensitive biological resources potentially affected in the project area are addressed in Exhibit P of the site certificate application filed with OOE (see Appendix B of this BA).

5.1 Federally Listed Plant Species

One federally listed plant species—the Applegate's milk-vetch—is evaluated in this biological assessment. Additional special-status plant species considered in the survey area but not evaluated further for project effects are discussed in Exhibit P of the site certificate application filed with OOE (see Appendix B).

Applegate's milk-vetch (*Astragalus applegatei*) was listed as an endangered species on July 23, 1993 (58 FR 40551). Applegate's milk-vetch is a perennial forb endemic to the Klamath Basin in southern Oregon. Information on the historical range of Applegate's milk-vetch is sparse. Presumably this species once occurred on alkaline floodplain habits throughout the lower Klamath Basin. Currently, the plant exists in only three populations near Klamath Falls, where it occurs on strongly alkaline, seasonally moist soil in areas with sparse vegetation (USFWS, 1998). The flowering period is between June and August. Population estimates suggest that there are approximately 12,000 individuals remaining, the majority of which occur on The Nature Conservancy's Ewauna Flat Preserve in Klamath Falls. Principle threats included invasion of non-native species, and hydrologic modification resulting from drainages and retention dikes.

There are no reported occurrences or historical records of Applegate's milk-vetch in the vicinity of the project area. Suitable soil conditions for this species are present in the analysis area. However, most of these areas have been converted to agricultural uses. No plants were identified during biological surveys. The project would have no effect on Applegate's milk-vetch.

5.2 Federally Listed Animal Species

5.2.1 Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle was listed as an endangered species in the lower 48 states on March 11, 1967 (32 FR 4001). Bald eagles were reclassified to threatened status on August 11, 1995. Bald eagle populations have made a significant recovery since listing and the bald eagle was proposed to be removed from listing in the lower 48 states on July 6, 1999 (64 FR 36453). Bald eagles are large raptors that feed primarily on fish, but also take mammals, birds, reptiles, and carrion. They typically hunt by watching prey from a high perch and swooping down to catch birds, fish, or mammals in their talons. Bald eagles also feed on carrion, take prey from other predators, or hunt by slowly soaring over water bodies and land areas and often flushing flocks of birds, taking the weak individuals. The breeding season begins in late winter to early spring depending on latitude. Nest locations are found in tall trees and rocky cliffs, and may be located as far as 10 miles from foraging areas (Csuti et al., 1997). This species is found in a variety of habitats, but is most often associated with open water bodies such as rivers, lakes, and marshes with abundant fish and waterfowl populations.

Bald eagles historically ranged throughout North America. On the west coast they are found from middle Alaska to California. As many as 1,000 bald eagles migrate to the Klamath Basin during January and February, where they feed primarily on the abundant waterfowl populations wintering in the Basin. The Upper Klamath region also supports the largest nesting bald eagle population in Oregon, where approximately 80 percent of the nest locations occur in ponderosa pine habitat (Anthony et al., 1982). The bald eagle is known to occur in the survey area and suitable nesting habitat was identified within the isolated stand of ponderosa pine habitat along the southern portion of the proposed electric transmission line. No nests were observed. The isolated stand of ponderosa pine is located 3,000 feet north of the Captain Jack Substation. Suitable upland foraging habitat that supports small mammals and carrion in the form of pronghorn antelope, wintering and resident deer, and cattle occurs on the Energy Facility site and routes of the water supply and natural gas pipelines.

The BLM Klamath Falls Resource Area has been collecting information on bald eagle nest locations in the vicinity of the Energy Facility since 1984. As of 2003, nest locations have been identified at McFall Reservoir and Bryant Mount. Large, mixed-conifer forests on Bryant Mountain also are used as winter roost sites for bald eagles. BLM has been conducting mid-winter bald eagle counts in the Langell, Poe, and Yonna Valleys since 1996. Mid-winter observations along the Poe and Yonna Valley survey routes have ranged from four to 16 eagles, and seven to 22 eagles have been sighted along the Langell Valley route (Raby, 2003).

Survey Results

During the mid-June 2002 biological surveys conducted by CH2M HILL biologists, two adult and two juvenile bald eagles were observed at McFall Reservoir, approximately 1 mile east of the proposed electric transmission line (Figure 5-1). On June 11, 2002, Steve Hayner (biologist for the Bureau of Land Management) reported a nest site at McFall Reservoir to Frank B. Isaacs, Senior Faculty Research Assistant at Oregon State University. Mr. Isaacs is a recognized bald eagle expert in this region. At this time, two mostly-feathered chicks, two adults, and four juvenile bald eagles were observed in trees around the reservoir (Isaacs, 2002). Adult and juvenile bald eagles were also observed flying and foraging over the area of the water supply wells, the water supply pipeline, the electric transmission line, and the Energy Facility site during the May, June, and July 2002 surveys. On July 9, 2002, one adult and six juvenile bald eagles were observed at McFall Reservoir. Nest locations have also been reported in the Bryant Mountain area (Figure 5-1) approximately 2 miles east of the proposed electric transmission line (ONHP, 2002).

Potential Project Effects

Construction and operation of the proposed Energy Facility would result in loss of marginal upland foraging habitat, potentially modify breeding behavior when temporary loud construction noise is present, and potentially increase collision with electric transmission line wires.

Loss of Forage Habitat. The proposed Energy Facility site and associated linear features would result in the permanent loss during the 30-year operating life of the Energy Facility of approximately 103.5 acres of potential upland foraging habitat for bald eagles. This area is composed of 31.6 acres of juniper-sage, 10.4 acres of sagebrush-steppe, 12.4 acres of ponderosa pine, 0.3 acre of pasture, 2.1 acres of unimproved pasture, and 40.9 acres of fallow field. Approximately 76 percent of the affected area is currently fallow agricultural land (46.7 acres) and juniper-sagebrush woodland (31.6 acres). Waterfowl prey species like bald eagles typically do not use this type of habitat. Other habitat types affected to a lesser degree include sagebrush-steppe, ponderosa pine forest, and agricultural lands. The loss of forage associated with project impacts to these habitat types would be offset by the additional forage created in the approximately 236-acre mitigation area. At Facility retirement, the project proponent would implement a Facility Retirement and Site Restoration Plan (Exhibit W of the EFSC site certificate application) to ensure that soil in and around the Energy Facility site is returned to conditions suitable for agricultural use.

Bald eagles are piscivores, preferring to feed on fish, although part of their diet may be small mammals, water birds and carrion. Eagles forage over large areas close to large water bodies and would travel several miles to foraging areas. The minimum home range for bald eagles reported in EPA's *Wildlife Exposure Factors Handbook* is 4,500 acres. Because the Energy Facility site is located at least 2 miles from documented foraging areas (the Lost River and several lakes on the west side of Bryant Mountain), which are more preferable foraging areas.

Salinity in Process Wastewater. Table 5-1 lists biological effects on selected waterfowl observed at various salinity concentrations. Salinity is not precisely equivalent to TDS, but for most purposes, they can be considered equal (United States Department of the Interior, 1998). For sodium, levels as low as 821 parts per million (ppm) reduced growth in 1-day-old mallard ducklings exposed for 28 days (Mitcham and Wobeser, 1988a). Mallard ducklings that drank water with 3,000 ppm of sodium had reduced thymus size and bone strength (Mitcham and Wobeser, 1988b). No apparent effects were observed at concentrations up to 911 ppm in 14-day mallard duckling exposures, while concentrations between 8,800 and 12,000 ppm caused 100 percent mortality (Mitcham and Wobeser, 1988a). In adult waterfowl, sodium concentrations of 17,000 ppm of sodium caused a die-off in North Dakota when fresh water was unavailable (Windingstad et al., 1987). If the evaporation pond alternative for management of process wastewater is selected, the evaporation pond would be netted and enclosed by a chain-link fence to prevent access by wildlife and birds to the evaporation pond.

Air Emissions. Maintenance of resident aquatic resources is important to the success of bald eagles. Moreover, maintenance of resident terrestrial habitats also is important to bald eagles, which use upland areas during the winter months when lakes and rivers are frozen (Brown and Amadon, 1968). Therefore, a screening-level ecological risk assessment (ERA) was conducted to address the potential risk from air emissions (and subsequent deposition to surface water) to aquatic organisms and to the bald eagle (with exposure by way of food web transfer). Upland areas surrounding the Energy Facility also were evaluated for possible risks to terrestrial plants, soil invertebrates, and terrestrial birds and mammals resulting from terrestrial deposition of air emissions. The procedures used in conducting the ERA were consistent with standard ODEQ and EPA guidance and consisted of the following sections: problem formulation, including identification of the chemicals of potential ecological concern (COPECs); exposure assessment; effects assessment; and risk characterization, including uncertainty analysis. The full-text screening-level ERA, including methods, assumptions, receptors, and screening values, is attached as Appendix C.

Ecological risks were evaluated based on conservative assumptions, maximum estimated media concentrations, and screening toxicity values. Because this screening assessment was based on conservative assumptions, constituents that passed the screen were considered to pose no significant risk to ecological receptors. Failure to pass the screen, however, cannot be concluded to represent the presence of risk. Rather, these results indicate that available data are insufficient to support a conclusion that ecological risks are absent. Constituents that failed the screen were reevaluated using more realistic assumptions.

None of the COPECs exceeded benchmarks for aquatic receptors; therefore, deposition of air emissions from the Energy Facility to surface water would pose no risk to aquatic organisms and bald eagles. For terrestrial receptors (i.e., plants, soil invertebrates, and birds and mammals), chromium, manganese, and nickel failed to pass the screening evaluation when total (incremental + background) concentrations were evaluated. However, in each case, these exceedances were driven by background concentrations. Background concentrations were obtained from readily available literature and regulatory agency guidance. Receptor-specific evaluation of chromium and cobalt exposure to birds resulted in no exceedances of literature-based toxicity thresholds.

Therefore, exposure to arsenic, cadmium, cobalt, and mercury associated with air emissions from the Energy Facility would pose no risk to plants, soil invertebrates, and birds and mammals, whereas potential risks to plants, soil invertebrates, and birds from exposure to chromium, manganese, and nickel are expected to be negligible. The conclusion from the screening-level ERA is that air emissions from the Energy Facility would not pose significant risk to bald eagles or their habitat.

Beneficial Use of Process Wastewater for Irrigation Pasture. For the process wastewater management alternative consisting of beneficial use of the water for irrigated pasture, constituents in the process wastewater would not be expected to be toxic to wildlife. A screening-level ERA following EPA and ODEQ guidance was conducted to determine the potential risk to plants, soil invertebrates, and wildlife from the process wastewater application (see Appendix C). Soil screening-level values for plants, invertebrates, birds, and mammals were available from ODEQ (2001) for many of the inorganic wastewater constituents. For birds, cobalt, iron, silver, thallium, and tin were lacking ODEQ screening values, but studies from which benchmarks could be developed for these metals were available. Similarly, iron, silver, tin, cyanide, and phenol benchmarks were developed for mammals from other sources.

Unlike the ODEQ screening values, which are presented as milligram (mg) constituent per kilogram (kg) soil, these benchmarks are presented as a dose (mg constituent/kg body weight/day) to the receptor. For comparison of these benchmarks, doses based on the maximum soil concentration, literature-derived wildlife parameters (i.e., diet, body weight, food ingestion rate, and soil ingestion rate), and literature-derived bioaccumulation factors for wildlife food items (i.e., plants and arthropods) were calculated for one bird (western meadowlark) and one mammal (deer mouse) for which exposure is likely to be high.

The process wastewater constituents evaluated, except aluminum, barium, boron, chromium III, copper, fluoride, iron, manganese, molybdenum, and nickel, passed the screening evaluation and are considered to present no risk to ecological receptors. After further evaluation, background concentrations were found to be the primary driver for screening failures of aluminum, barium, chromium III, copper, fluoride, iron, manganese, and nickel, with negligible incremental contributions of these constituents to the risk estimation. Considering the bioavailability of boron to plants (less than 5 percent of total boron) substantially reduced the risk estimation for boron. Although both incremental and total (incremental + background) boron concentrations continued to exceed screening levels for sensitive plant species, incremental and total exposures were below toxicity thresholds for invertebrates and for boron-tolerant plant species when adjusted for boron bioavailability. Estimated maximum concentrations of molybdenum exceeded the soil benchmark for plants; however, risk to terrestrial plants from molybdenum exposure is considered low because of the low exceedance of the screening value and the highly conservative assumptions applied to the risk estimation. Thus, none of the constituents evaluated are considered to present significant risk to ecological receptors.

Noise. Construction and noise from operating the Energy Facility may affect foraging and nesting behavior of bald eagles in the project area. Noise modeling was conducted to predict the Energy Facility's noise emissions during operation. The modeling assumes a "worst-case" scenario, with the Energy Facility operating under steady-state conditions at full capacity and with the combustion and steam turbines at base load and cooling tower fans on. After Energy Facility noise emissions were determined, modeling was performed to predict sound levels in the area around the Energy Facility (Figure 5-2). This modeling conservatively assumes environmental conditions that facilitate sound transmission and does not take into account additional mitigation factors such as vegetation and topography.

The Energy Facility site is located in a rural and relatively quiet area with ambient background noise at approximately 20 to 30 dBA. Peaks exceed 70 dBA near farm equipment. Ambient noise levels resulting from the operation of the proposed Energy Facility are estimated to be 40 dBA at approximately 2,500 feet from the Energy Facility. For comparison, a typical cooling fan on a desktop computer is 40 to 45 dBA at the operator's ears, and rustling leaves in a light breeze are generally louder than 30 dBA. Operational noise levels are expected to dissipate to approximately 35 dBA at a distance of approximately 4,000 feet from the Energy Facility (Figure 5-2). Power plant noise is typically very steady in nature, with no significant tones or impact type noises. The noise is similar to an idling car or a neighbor's air conditioning unit. The Energy Facility noise would tend to be a steady faint background noise source that is part of the steady background noise environment.

Because the Energy Facility site would be located in a low area (relative to surrounding topography), noise impacts to nearby habitat areas would be limited in geographic area and would likely be minor. The noise level during operations is estimated to be a maximum of 50 dBA immediately adjacent to the Energy Facility (Figure 5-2). Maximum noise levels resulting from the electric transmission line are expected to be 43 dBA at the edge of the right-of-way, dissipating to less than 30 dBA beyond 3,000 feet. It is unlikely that operation of the Energy Facility would result in adverse effects on the wildlife-inhabiting areas near the Energy Facility site, as the operational noise levels would likely be below the reported levels (80 to 100 dBA) known to be detrimental to wildlife and wildlife typically become habituated to the relatively low operation noise levels (Bowles, 1995).

Noise resulting from construction activities is expected to be greater than operational noise. Noise during construction would be temporary, but may cause bald eagles to reduce their use of nearby habitats and alter their behavior during the day when construction noise is present by modifying foraging and nesting locations. Additional noise impacts may result if blasting is required for installation of transmission tower footings. Noise associated with blasting and intermittent noise from pile driving would result in disturbance to nesting eagles in the area. See Appendix D for more detailed discussion of noise impacts on wildlife.

Ambient Light. Operation of the Energy Facility would result in an increase in ambient light. The disturbance effects would be localized to the immediate area of the Energy Facility and eagles would be expected to habituate to these changes. Low-impact directional lighting would be used to focus the light directly toward the Energy Facility, thus reducing ambient light into adjacent areas.

Avian Electrocution. The electric transmission line should not pose risk of electrocution to eagles. The towers would be designed and constructed with adequate separation between phase conductors and conductors to ground so that they would be wider than a large bird's wings and would not bridge any space that could result in the conduction of current. With these design features, there should be no risk of electrocution from the electric transmission line.

Avian Collisions. The Energy Facility may affect the bald eagle through collisions with the electric transmission line. Critical factors in determining the potential for a strike include the height of the towers and lines compared with the normal flight behavior of the bird, wing-loading and its effects on maneuverability, visibility, and the number of times a bird crosses the electric transmission line during daily flight. Collisions by raptors and songbirds are considered to be low owing to the maneuverability and flight behavior of these birds (APLIC, 1994). Most areas with high rates of collisions are located close or parallel to areas used by waterfowl (high-wing-load birds) with adverse sight conditions (e.g., fog and low clouds). Collisions typically occur when birds are moving between foraging areas and resting areas during bad weather conditions. To reduce the potential of avian collisions, the project proponent would provide mitigation by installing BFDs on the top static wires along the entire electric transmission line.

Avoidance and Minimization Measures for Bald Eagles

Preconstruction Surveys. Preconstruction surveys would be conducted by qualified biologist for suitable nesting habitat within a 1/2 mile line-of-site and 1/4 mile no line-of-site radius of the proposed Energy Facility, water supply pipeline, natural gas pipeline, and electric transmission line. Surveys would note any foraging areas used by bald eagles. Any active nest locations identified within the survey area would be recorded using a submeter accuracy Global Positioning System (GPS) and mapped on aerial photo base maps of the survey area. Information on known nest locations would also be obtained from previous surveys conducted in the area.

Monitoring Active Nest Sites. In the event that an active nest location is identified in the study area, maps showing ½- to ¼-mile avoidance areas would be generated and construction timing restrictions would be implemented to minimize or avoid potential impacts to nesting birds. Potential impacts include abandonment of young birds or nests by adults, and disturbance of essential forage habitats that result in unsuccessful reproduction. Construction in areas within a ½-mile line-of-site or ¼-mile no-line-of-site from active nests should be postponed, if possible, until after the fledglings are no longer dependent on the nest tree. If construction cannot be postponed in the area of an active nest until the young are fledged, then the nest site would be monitored by a qualified biologist during courtship, nest building, incubation, and the period while raising their young in relation to project activities. The monitoring biologist would stop work if it appears the activities impede reproduction. The biologist would coordinate with ODFW and USFWS on when to allow construction to resume. Monitoring reports would be prepared and submitted.

Avian Electrocution. The electric transmission line would be designed to prevent avian electrocutions. To prevent electrocutions, conductor wires would be spaced further apart than the wing span of a large birds (24 feet on the vertical and 25 feet on the diagonal) (APLIC, 1996).

Avian Collision. Avian collision with the top groundwires could occur year-round. The potential for eagle collisions with the electric transmission line is considered to be low because their foraging behavior is relatively slow (compared to peregrine falcon and other raptors). To minimize impacts to bald eagles (and other birds in the area), colored BFDs would be installed on the top groundwires to make them more visible to birds during flight and minimize bird collisions. BFDs are 15-inch-long PVC tubing coiled to a height of 7 inches, spaced 16 feet apart along the wires (see the avian collision monitoring plan in Appendix E). BFDs are especially effective at increasing visibility of wires during fog and rain events and have reduced avian collisions by 57 to 89 percent (Brown and Drewien, 1995).

Annual monitoring of the lines would be conducted to determine if the lines have substantial effects on waterfowl and special-status birds that forage or nest in the area. Avian collision studies are being developed to monitor the effectiveness of the BFDs, as discussed in Appendix E. The monitoring plan would include observations at the Energy Facility site and along the route of the new electric transmission line. If monitoring results show that bald eagles are foraging at the water supply reservoir, remedial actions may be implemented as described in Appendix E.

Compensatory Mitigation Measures

Compensatory mitigation for the loss of upland bald eagle foraging habitat would be managed with the establishment and restoration of an approximately 236-acre mitigation area in fallow agricultural field and degraded juniper woodland habitat north and west of the Energy Facility (see Appendix A). The mitigation area would benefit the bald eagle by creating new forage to offset the relatively minor impacts to sagebrush-steppe and ponderosa pine stand. The mitigation would also benefit several wildlife species besides the bald eagle. The mitigation area would be fenced with wildlife-friendly fencing and include water troughs for wildlife.

5.2.2 Shortnose and Lost River Sucker

The shortnose sucker (*Chasmistes brevirostris*) and Lost River sucker (*Deltistes luxatus*) were listed as endangered on July 18, 1988 (53 FR 27130). The shortnose sucker is endemic to the Upper Klamath Basin of southern Oregon and northern California. Shortnose suckers are found in numerous lakes and rivers throughout the region, including Upper Klamath Lake, Clear Lake Reservoir, Gerber Reservoir, Tule Lake, the Klamath River, and the Lost River system. While primarily a lake-dwelling fish, it spawns between February and May in river habitats with gravelly substrates including the Sprague, Williamson, and Wood Rivers, as well as Crooked Creek and the Clear Lake watershed. Shoreline areas with a mosaic of open water, emergent vegetation, and woody structures are important for larval development. The shortnose sucker is a bottom feeder whose diet includes detritus, zooplankton, algae, and aquatic invertebrates.

Shortnose Sucker

Historically, shortnose suckers were abundant throughout the Klamath Basin (Federal Register, 1988). However, dams, diversion structures, irrigation canals, and development of the Klamath Basin have resulted in habitat fragmentation and population isolation. Additional factors leading to the population decline include loss of wetland habitat, hybridization, predation and competition from exotic fish species, and poor water quality. Hypereutrophication of lake habitats appears to be a principle factor in poor recruitment of this species (USFWS, 1993).

The shortnose sucker has historically been reported in the Lost River above Harpold Reservoir, approximately 4 miles south of the Energy Facility site, and at Bonanza Big Springs, located approximately 3 miles north of the Energy Facility Site (USFWS, 1993).

Lost River Sucker

The Lost River sucker is endemic to the Upper Klamath Basin of southern Oregon and northern California. The Lost River sucker is found in Upper Klamath Lake, Clear Lake Reservoir, Tule Lake, the Klamath River, and the Lost River. The Lost River sucker is a lake-dwelling fish that spawns between February and May in tributary rivers and streams with gravelly substrates. Shoreline habitats that have open water intermixed with emergent vegetation are important for larval and juvenile development. This species feeds on a variety of aquatic invertebrates, algae, detritus, and zooplankton found on lake bottoms.

Dams, diversion structures, irrigation canals, and development have resulted in habitat fragmentation and population isolation. Competition and predation by exotic species, wetland drainage, poor water quality, and eutrophication have also contributed to the decline of this species.

The Lost River sucker historically has been reported in the Lost River above Harpold Reservoir, approximately 4 miles south of the Energy Facility site, and at Bonanza Big Springs, located approximately 3 miles north of the Energy Facility Site (USFWS, 1993).

Survey Results

No perennial fish-bearing streams were identified in the area immediately adjacent to any of the proposed Facility features. However, irrigation canals may provide habitat for listed fish species (LeCaptain, 2002). While surveys were not conducted in any of the irrigation canals located in the project area, fish were observed in one of the irrigation drainages near the Babson well site during the Babson well pump test. Greg White, a fisheries biologist with CH2M HILL, met with Leonard LeCaptain of USFWS on September 24, 2002, to investigate this drainage and determined that these fish were most likely red shiners, a nonlisted minnow species. This discharge of water from the deep zone occurred only during the pump test and as described above. During operation of the Energy Facility, there would be no discharge of wastewater to surface water.

Critical Habitat

Critical habitat was proposed by USFWS for the shortnose sucker and the Lost River sucker on December 1, 1994 (FR 59, No. 230). Proposed units near the project area include:

- Unit 2—Tule Lake. Located approximately 13 air miles south of the project area, this unit includes Tule Lake and the Lost River up to the Anderson Rose Dam.
- Unit 3—Klamath River. Located approximately 20 air miles west of the project area, this unit includes the Klamath River from the Iron Gate Dam in northern California to the Link River Dam in southern Oregon.
- Unit 4—Upper Klamath Lake. Located approximately 22 air miles west of the project area, this unit includes Upper Klamath Lake and portions of the watershed on the west side and Agency Lake, including much of the Wood River Watershed.
- Unit 5—Williamson and Sprague River. Located approximately 20 air miles north of the project area, this unit includes the Williamson River from Upper Klamath Lake to the confluence with the Sprague River and the Sprague River upstream to the confluence with Brown Creek.
- Unit 6—Gerber Reservoir. Located approximately 10 air miles east of the project area, this unit includes Gerber Reservoir and portions of the Ben Hall, Barnes, Barnes Valley, Pitchlog, and Wildhorse Creek Watersheds.

Air Emissions. The potential risk from air emissions (and subsequent deposition to surface water) to aquatic organisms (e.g., shortnose and Lost River suckers) was included in the screening-level ERA described above for bald eagles. The full-text screening-level ERA, including methods, assumptions, receptors, and screening values, is attached as Appendix C.

Although these the shortnose and Lost River suckers are located north of the proposed Energy Facility, which is outside the area predicted to experience the maximum concentrations from the air emissions, the maximum concentration was used in the risk evaluation. Additionally, ODEQ screening level values for aquatic biota were used to evaluate potential risk to the two endangered fish species. These values are intended to protect 95 percent of aquatic species, 95 percent of the time. Therefore, constituents that passed the screen were considered to pose no significant risk to aquatic organisms.

None of the COPECs exceeded benchmarks for aquatic receptors; therefore, deposition of air emissions from the Energy Facility to surface water are considered to pose no risk to shortnose and Lost River suckers.

Project Impacts

Process Wastewater Management and Stormwater. Under the preferred alternative, the Energy Facility would not discharge to surface waters. Process wastewater from the Energy Facility (excluding the sanitary wastewater) would be managed by one of three alternatives:

- Beneficial use of the water for irrigated pasture
- Evaporation in an onsite, lined evaporation pond
- Storage and hauling to a WWTP for offsite disposal

Stormwater runoff from the Energy Facility would be collected in an engineered stormwater system and routed to a stormwater pond. The stormwater pond would be sized to detain approximately 750,000 gallons (2.3 acre-feet) of water based on a 25-year storm event. This stormwater pond would allow sediment and other suspended solids to settle before the stormwater is discharged and routed to a 4.7-acre infiltration basin. For these reasons, stormwater runoff from the Energy Facility would not likely have any measurable impact on surface water quality in the vicinity of the Energy Facility, including the Lost River or irrigation canals. The stormwater pond is located on the Energy Facility site immediately adjacent to the air-cooled condensers. Bald eagles and other birds are not expected to forage around the stormwater pond owing to the proximity of noise generating equipment.

No surface water would be used for Facility operations. The raw water for the Energy Facility would come from a well system that produces water from water-bearing zones below 1,500 feet bgs.

Improbable Worst-Case Connection. Previous borehole geophysics and aquifer testing at the Babson well identified the presence of two separate aquifer systems (CH2M HILL, 1994). The shallow aquifer system (above approximately 500 feet) is a heavily appropriated basalt aquifer that is in varying degrees of hydraulic connection with the Lost River and Bonanza Big Springs. The shallow system is used for irrigation and domestic water supply. The deep aquifer system produces water from water-bearing zones below 1,500 feet bgs. No data gathered from the monitoring well network during a pump test conducted in August and September 2002 indicate that the deep aquifer withdrawals would impact groundwater levels in the shallow aquifer, or flows at Bonanza Big Springs and the Lost River.

The available evidence supports the conclusion that there is no hydraulic connection between the deep and shallow zones, which include the Lost River. However, if one were to assume that an extremely efficient hydraulic connection did in fact exist between the deep system and the Lost River, any impact on the Lost River from the proposed pumping would be imperceptible. To demonstrate this fact, the project proponent conducted a “worst-case” analysis (Appendix F). The analysis is not intended to describe an outcome that is likely or even plausible, but rather shows that even if one makes the most conservative assumptions at every step of the process, there still is no potential for a measurable impact on the Lost River.

The assumptions used in this analysis are sufficiently conservative that they do not actually represent the most probable outcome: no impact at all. This analysis is provided only to create a framework for understanding the magnitude of any potential impact, not to describe a physical mechanism for what might actually occur. The repeatedly conservative assumptions used in this analysis indicate that the maximum reduction in the lowest range of summer flows of the Lost River is roughly 0.00074 gpm as the river passes through the 2-mile reach closest to the Babson well. This reduction would represent a 0.000004 percent reduction in the lowest range of summer flows. This degree of connection is unlikely, and it is additionally unlikely that this impact would result in an impact to fish habitat or passage if it were to occur.

Avoidance and Minimization Efforts

The use of water from a deep zone aquifer system would avoid impacts to surface water. The zero discharge wastewater system would minimize water use and water quality impacts to surface water and the shallow groundwater under the Energy Facility site. The stormwater system would minimize water quality impacts to irrigation canals and to the Lost River.

Mitigation Measures

No additional mitigation measures are proposed for listed fish species.

5.3 Cumulative Effects

In the Klamath Ecological Province, agricultural development and water diversions have had a significant impact on the amount of native plant communities and wetlands throughout the Klamath Basin. Biodiversity has been reduced by the loss and fragmentation of native habitats. The proposed Energy Facility would contribute marginally to the further loss of habitat. At Facility retirement, the project proponent would implement a Facility Retirement and Site Restoration Plan (Exhibit W in the EFSC site certificate application) to ensure that soil in and around the Energy Facility site is returned to conditions suitable for agricultural use.

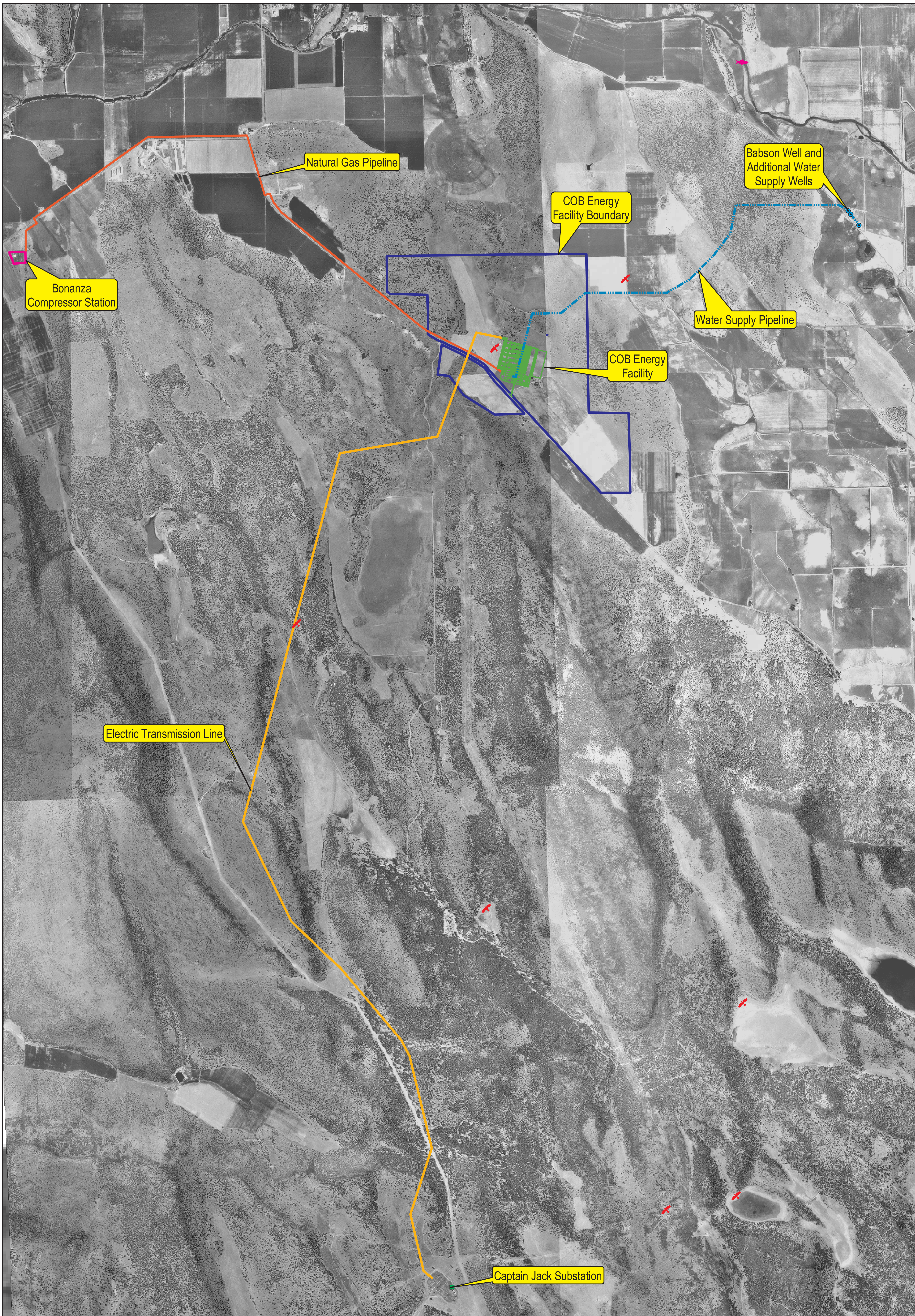
The new electric transmission line could increase the overall avian collisions in the Bryant Mountain area. The installation of BFDs on the top groundwires of the proposed new electric transmission line would minimize the potential for increased collisions in the area.

No cumulative affects on the Applegate’s milk-vetch, Lost River sucker, and shortnose sucker are expected to occur as a result of the proposed project.

TABLE 5-1
Known Effects to Selected Waterfowl Species from High Salinity Levels

Species	Salinity Concentration in Water (ppm)	Effects/Comments	Reference
Mallard	~ 11,000	Reduced growth	Swanson et al., 1984
	8,800–12,000 (as sodium)	100% mortality	Mitcham and Wobeser, 1988a
	9,000–12, 000	No Effect	Nystrom and Pehrsson, 1988
	10,000–15,000	Level of concern	Swanson et al., 1984
	15,000	100 percent mortality (7-day-old ducklings)	Barnes and Nudds, 1991
Mottled Duck	9,000	Threshold level for adverse effects	Moorman et al., 1991
	12,000	Reduced growth, 10% mortality	
	15,000	90% mortality	
	18,000	100% mortality	
Peking Duck	20,000	Level of concern	Nystrom and Pehrsson, 1988

Source: U.S. Department of the Interior. 1998. *Guidelines for Interpretation of the Biological Effects of Selected Constituents in Biota, Water, and Sediment*. National Irrigation Water Quality Program Information Report. No. 3. Table 30.



Legend

- Captain Jack Substation
- Babson Well and Additional Water Supply Wells
- COB Energy Facility Boundary
- Bonanza Compressor Station
- COB Energy Facility
- Electric Transmission Line
- Natural Gas Pipeline
- Water Supply Pipeline
- Short Sucker
- Bald Eagle

N

1 inch equals 2,919 feet

Figure 5-1

Rare, Threatened, and Endangered Species Biological Assessment

COB Energy Facility
Bonanza, OR

PEOPLES ENERGY RESOURCES

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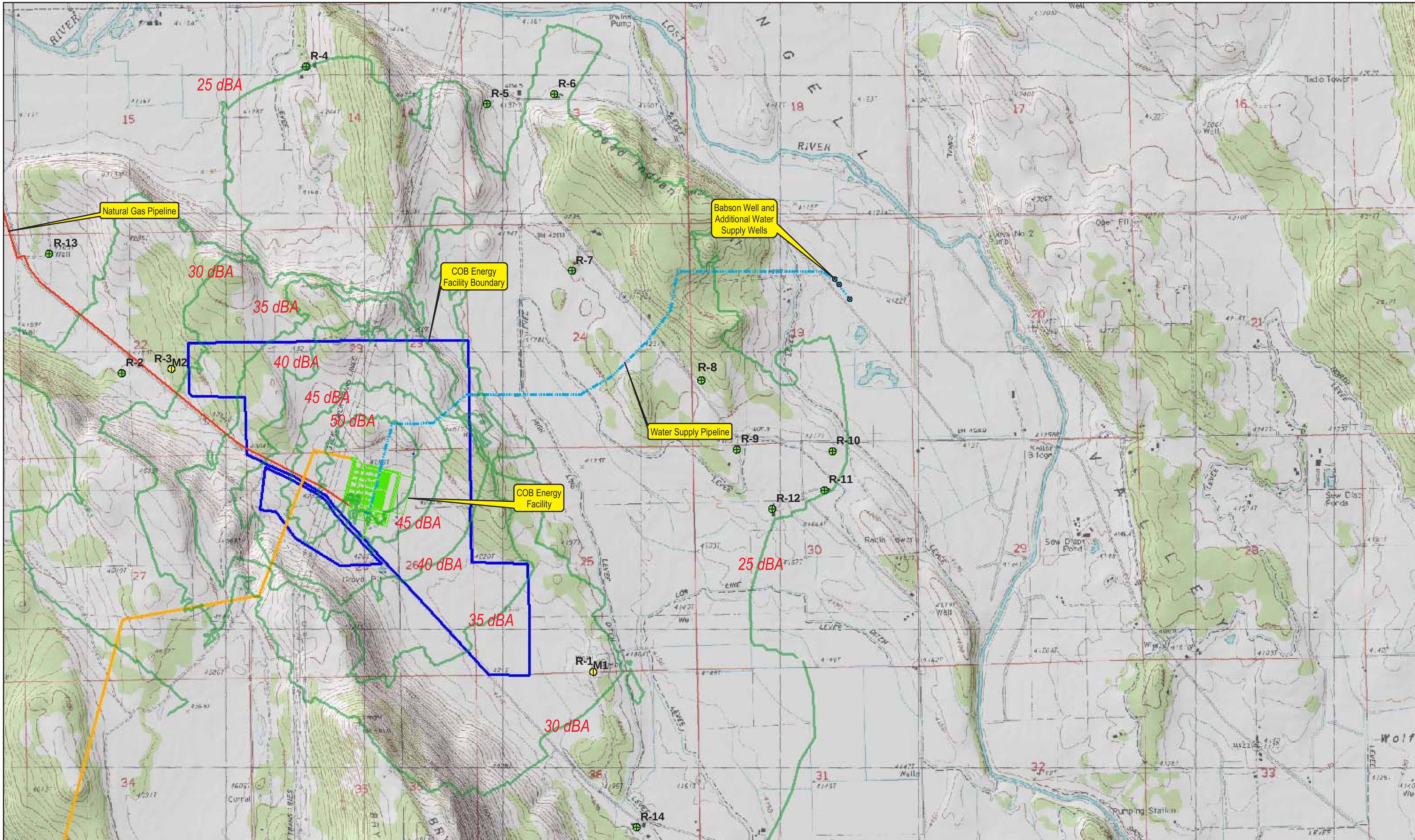

Legend

- Babson Well and Additional Water Supply Wells
- COB Energy Facility Boundary
- COB Energy Facility
- Electric Transmission Line
- Natural Gas Pipeline
- Water Supply Pipeline
- Noise Contours
- Monitoring Locations
- Receptors

N

1 inch equals 2,100 feet

0 800 1,600 3,200 Feet

Figure 5-2

Predicted Noise Levels

Biological Assessment

COB Energy Facility

Bonanza, OR

PEOPLES ENERGY

SECTION 6

Conclusion

This section summarizes the conclusions reached for the following federally listed species.

6.1 Applegate's Milk-Vetch

The proposed project would have no effect on Applegate's milk-vetch. No populations of this species are known to occur in the vicinity of the project area and none were identified during field surveys.

6.2 Lost River and Shortnose Suckers

The proposed project would have no effect on either the Lost River sucker or the shortnose sucker. Water would be supplied from a deep aquifer system that is isolated from surface water features providing habitat to these species. The Energy Facility would be designed to be zero discharge. Therefore, no wastewater would be discharged into any surface water or irrigation canal.

6.3 Bald Eagle

The conclusion of the BA for bald eagles is as follows: "The project may affect, likely to adversely affect, bald eagles." Bald eagles are known to occur in nest locations that have been confirmed approximately 1 mile from the proposed new electric transmission line. Temporary effects to bald eagles foraging in the project area may occur from temporary construction noise at the Energy Facility site and along the route of the electric transmission line. Bald eagles are expected to acclimate to the continuous noise from the Energy Facility and the noise should not adversely affect foraging efforts. Preconstruction surveys and timing restrictions on certain activities would be required to minimize adverse effects if active nest locations are identified within ½ mile of project activities. Impacts to bald eagles from the loss of marginal foraging habitat at the Energy Facility site would be less than significant with implementation of the mitigation area.

The proposed new electric transmission line may cause an increase in avian collisions in the area. Bird flight diverters would be placed on the top groundwires to reduce the potential for collisions. Annual monitoring of the new lines would be conducted to determine if the lines cause substantial effects to the bald eagle population.

Implementing the compensatory mitigation measure (preserving, enhancing, and managing the approximately 236-acre mitigation area north and west of the Energy Facility) would benefit bald eagle foraging in the long-term, and would also benefit other wildlife such as mule deer, antelope, sagebrush lizard, and prey species for raptors such as mice and gophers. At Facility retirement, the project proponent would implement a Facility Retirement and Site Restoration Plan (Exhibit W in the EFSC site certificate application) to ensure that soil in and around the Energy Facility site is returned to conditions suitable for agricultural use.

SECTION 7
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